

JPRS 78263

10 June 1981

# **China Report**

**AGRICULTURE**

**No. 144**

**1980 Yearbook: Agriculture Section**



**FOREIGN BROADCAST INFORMATION SERVICE**

#### NOTE

JPRS publications contain information primarily from foreign newspapers, periodicals and books, but also from news agency transmissions and broadcasts. Materials from foreign-language sources are translated; those from English-language sources are transcribed or reprinted, with the original phrasing and other characteristics retained.

Headlines, editorial reports, and material enclosed in brackets [] are supplied by JPRS. Processing indicators such as [Text] or [Excerpt] in the first line of each item, or following the last line of a brief, indicate how the original information was processed. Where no processing indicator is given, the information was summarized or extracted.

Unfamiliar names rendered phonetically or transliterated are enclosed in parentheses. Words or names preceded by a question mark and enclosed in parentheses were not clear in the original but have been supplied as appropriate in context. Other unattributed parenthetical notes within the body of an item originate with the source. Times within items are as given by source.

The contents of this publication in no way represent the policies, views or attitudes of the U.S. Government.

#### PROCUREMENT OF PUBLICATIONS

JPRS publications may be ordered from the National Technical Information Service, Springfield, Virginia 22161. In ordering, it is recommended that the JPRS number, title, date and author, if applicable, of publication be cited.

Current JPRS publications are announced in Government Reports Announcements issued semi-monthly by the National Technical Information Service, and are listed in the Monthly Catalog of U.S. Government Publications issued by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Indexes to this report (by keyword, author, personal names, title and series) are available from Bell & Howell, Old Mansfield Road, Wooster, Ohio 44691.

Correspondence pertaining to matters other than procurement may be addressed to Joint Publications Research Service, 1000 North Glebe Road, Arlington, Virginia 22201.

10 June 1981

CHINA REPORT  
AGRICULTURE

No. 144

## 1980 YEARBOOK: AGRICULTURE SECTION

Beijing and Shanghai ZHONGGUO BAIKE NIANJIAN 1980 [YEARBOOK OF THE GREAT ENCYCLOPEDIA OF CHINA, 1980] in Chinese Aug 1980 pp 336-363

[The following is the text of the section on agriculture in the ZHONGGUO BAIKE NIANJIAN 1980]

## CONTENTS

Agricultural Policies and Administration and Management	1 .
Structure of Agriculture and Farming System	9
Modernization and Mechanization of Agriculture	15
Soil, Fertilizer, Seeds, Plant Protection	24
Forestry	40
Livestock and Sideline Occupations	52
Aquatic Products	62
State Farms and Land Reclamation	70
Agricultural Science Research and Education	74

**[Text] Agricultural Policies and Administration and Management**

**Chinese Communist Party Central Committee Decision on Some Questions Concerning  
the Acceleration of Agricultural Development**

In order to change with all possible speed the backward condition of China's agriculture and accelerate agricultural development to meet the urgent needs of carrying out the four modernizations, in September 1979, the Fourth Plenary Session of the 11th Chinese Communist Party Central Committee formally passed the "Chinese Communist Party Central Committee Decision on Some Questions Concerning the Acceleration of Agricultural Development." The draft of this "Decision" was made and passed in principle in 1978 by the Third Plenary Session of the 11th Chinese Communist Party Central Committee. Subsequently, following nationwide discussion and trial implementation, it met with an enthusiastic welcome from the broad masses of cadres and people in rural villages. On the basis of national discussions and trial implementation, the Fourth Plenary Session of the 11th Party Central Committee collected the views of the masses and of the cadres, made necessary revisions to the draft, and only then formally promulgated it throughout the nation.

The "Decision" is divided into a total of four parts.

The first part analyzes the current condition of China's agriculture, and summarizes the positive and negative experiences in the development of agriculture since the founding of the People's Republic. To unify the partywide understanding of agricultural problems, it puts forward the major lessons of experience that should be borne in mind in dealing with the following seven aspects: need for long term maintenance of a stable and unified political situation; correct understanding and handling of class struggle in rural villages with the purging of the pernicious influence of the ultra-leftist line; taking in hand reform of agricultural technology to the development of agricultural productivity; stabilizing the party's current policies for rural villages; carrying out a program of "agriculture as the foundation;" correctly and completely adhering to the policies of simultaneous development of "agriculture, forestry, livestock raising, sideline occupations, and fisheries" and of "taking grain as the key link for all-around development according to local situations and with proper centralization;" and improving the leadership work style for agriculture.

In order to fully arouse the initiative of 800 million peasants, to truly strengthening the material and technological support to agriculture by the state to lighten the burden on the peasants and hasten agricultural development, and to put down a

foundation for the realization of agricultural modernization, the second part of the decision proposes agricultural policies, rural economic policies and measures for increasing production, totalling 25 items, including the following: respect for the communes' and brigades' right to self-determination; implementation of the principle of distribution in accordance with work; encouragement to commune members to farm private plots, to raise private livestock and to operate family sideline occupations to develop county fair trade; stabilization of the three-level system of ownership for which production teams form the foundation; gradually increasing investment in agriculture; increasing agricultural loans; raising the state purchase price for agricultural products; stabilizing state requisition quotas for grain; doing a good job in capital construction in agriculture; reclamation of wastelands; good operation of state farms; increasing output of materials used in agriculture; development of mechanization; taking in hand production of industrial crops; planting of trees for afforestation, development of the livestock industry, the fishing industry, and commune and brigade enterprises; assistance to hardship areas with low output and grain shortage; and doing a good job in family planning--all for the purpose of raising agricultural productivity.

The third part, taking account of the realities of China's agriculture, provides eight plans for modernizing agriculture. These plans call for: the establishment of a huge force of experts of agricultural science and technology; launching of work for the mechanization of agriculture; doing a good job in formulating a rational plan for agriculture; state investment must stress the building of bases for commodity grain, industrial crops, the livestock industry, fisheries, and the forestry industry; use of modern industries, communications and transportation to equip agriculture; building of a modernized processing industry for agricultural and livestock products; development of the building of small cities and towns and intensification of urban assistance to rural villages; and implementation of the principle of concentrating all forces to fight a war of annihilation.

The fourth part proposes, by way of meeting the needs of the modernization of agriculture, a strengthening of party and government leadership over agricultural to carrying out unwaveringly the party's line, programs, and policies.

The "Chinese Communist Party Central Committee Decision on Some Questions Concerning the Acceleration of Agricultural Development" portrays the historic demands in the development of Chinese agriculture, expresses the desires of the people of the entire country, and is a programmatic document for a long future period for bringing about the modernizing of Chinese agriculture. Publication and implementation of the "Decision" serves to give extreme impetus to and will produce a wide ranging impact on further emancipating the thoughts of the broad masses of rural village cadres, fully arousing the socialist initiative of hundreds of millions of peasants, consolidating the good situation in rural villages that has developed since the smashing of the "gang of four," and accelerating agricultural development and the four modernizations.

(Zheng Yanshi) [6774 0917 0670]

#### Respect for Production of Team Self-Determination

The issue of respect for the self-determination of production teams was unequivocally spelled out as long ago as September 1962 in the "Rural People's Commune Work

Regulations (Revised Draft)" passed by the 10th Plenary Session of the 8th Party Central Committee. However, during the period of rampage by Lin Biao and the "gang of four," the ownership and self-determination rights of production teams sustained serious transgression in the following manners: the workforces, capital, products and materials belonging to production teams were transferred or taken over without compensation in the name of cooperation, adding to the burdens of the peasants; in the planting and caring for crops, "arbitrary uniform action" was required instead of taking account of realities; or else high requisition on procurement and on fund accumulations were made in the distribution of grain and income so that commune members received no increase in earnings or rations after producing more.

Following destruction of the "gang of four," the Chinese Communist Party Central Committee enacted this decision, reiterating the need to respect the right of self-determination of the basic accounting units in people's communes, and also pointing out that "the ownership and self-determination rights of people's communes, production brigades, and production teams must receive the full protection of national laws, and that no unit or individual may deprive or transgress these rights at will." So long as production teams uphold their socialist direction, carry out national policies, laws, and ordinances, and accept the guidance of state plans, they have: the right to plant what they want according to local situations and seasons; the right to decide measures for increasing output; the right to decide methods of administration and management; the right to distribute their own products and cash; and the right to resist blind guidance from any leadership organization or leader. Following implementation of this basic policy for rural villages, a striking change has occurred in the practice of "every quarter putting out their hands to the production teams," and the turmoil caused by the "poverty transition" has been virtually turned around; blind guidance in production has also been substantially overcome; and the practice of handling matters realistically and in accordance with objective laws is the process of revival and development. This possesses major significance for further arousal of the initiative of cadres and commune members and for promoting the development of agricultural production.

(Jiang Shufang) [5592 3219 5364]

#### Implementation of the Principle to Each According to His Work

During the period of rampage of Lin Biao and the "gang of four," the socialist principle of to each according to his work" was termed a capitalist principle and was summarily criticized; the system of distribution according to labor in people's communes was interfered with and destroyed; and egalitarian tendencies were quite strong, dampening the enthusiasm for labor of the broad masses of peasants and hampering development of the rural collective economy. Following the smashing of the "gang of four," these mistakes were gradually corrected. The "Chinese Communist Party Central Committee Decision on Some Questions Concerning the Acceleration of Agricultural Development" requires rural communes and production brigades to conscientiously carry out the principles of from each according to his ability and to each according to his work, thus reviving and promoting various forms of remuneration calculating methods and that had a system of responsibility for production and were in accordance with the principle of to each according to his work. This was welcomed by the broad masses of peasants.

The system of distributions according to one's work in people's communes requires recognition that differences in remuneration will exist, and demands that remuneration be made on the basis of quantity and quality of individual labor so that those who work more will receive more return and those who work less, the less the return, while males and females receiving equal pay for equal work. Calculation of remuneration may be through the recording of points for a quota or the recording of points for time with an evaluation of work done, or it may, so long as it accords with production team uniform accounting and distribution, be a contracting of work to work teams, linking output to the calculation of remuneration and instituting rewards for excess production. These three ways of calculating remuneration are related in different degrees to the quantity and quality of work done, and the worker must bear definite responsibility for work results in reflection of the principle of distributions in accordance with work. It was also ruled that division of fields for individual working would not be permitted, and that contracting for production with individual households would not be done except in separate special circumstances. In 1979, communes and production brigades throughout the country individually put into effect the aforementioned several forms of calculating remuneration on the basis of their own individual specific circumstances and different levels of production management to revive the system of rewards and penalties, vigorously arousing the enthusiasm for socialist production of the broad masses of peasants.

(Wang Wancang) [3769 5502 0221]

#### Increased State Procurement Prices for Agricultural and Sideline Products

Prior to the Great Cultural Revolution, the Chinese government gave rather serious attention to the comparative price relationships in the exchange of industrial and agricultural products, on several occasions increasing the state purchase price for agricultural and sideline products and lowering the market price of the means of production for agriculture and for some industrial goods, and gradually contracting the price scissors between industrial and agricultural products inherited from old China. During the Great Cultural Revolution, as a result of Lin Biao and the "gang of four's" pursuit of an ultraleftist line, it was not possible to make prompt readjustments to raise the state procurement price for some agricultural and sideline products for which suitable increases should have been made. This plus the gradual increased use during these years of farm machines, chemical fertilizer, and pesticides, which greatly increased the costs of agricultural production, meant that some communes and brigades increased output without increasing earnings, or even increased output only to get reduced earnings.

In order to rapidly change this irrational state of affairs, the State Council decided on a series of increases in the state procurement prices for some agricultural products beginning March 1979. Among these, the uniform procurement price for grain was raised 20 percent from the time summer grain went to market, with any above-quota purchases being at a price 50 percent greater than this. Commensurate increases were also made depending on individual circumstances in the procurement prices paid for cotton, oilseeds, and live hogs. More than 18 different major agricultural and sideline products nationwide have had their procurement prices raised, the average increase being 24.8 percent. With a reduction in manufacturing costs, the factory prices and the market sale prices for farm machines, chemical fertilizers, and agricultural pesticides have also fallen,

substantially passing on to the peasants advantages from a reduction in manufacturing costs. This measure has stimulated the enthusiasm of hundreds of millions of peasants. Their efforts to develop production, and their enthusiastic sales to the state of agricultural and sideline products have greatly enriched and enlivened the markets of cities and the countryside. In 1979, state procurement of agricultural and sideline products totaled 27.6 percent more than during the previous year.

(Xie Zifen) [6200 5261 1164]

#### Reducing the Senseless Burden on the Peasants

As a result of promotion of an ultra-leftist line by Lin Biao and the "gang of four" during the Great Cultural Revolution, the manpower, financial resources and material resources of production teams were egalitarianally and indiscriminately used without compensation, and the fruits of the peasants' labor were willfully swallowed up. This plus various types of apportionments and subsidies increased the peasants' burdens. In this regard, in June 1978, the CCP Central Committee transmitted the experiences of the Xiangxiang County CCP Committee in Hunan Province on conscientious implementation of the party's rural economic policies and efforts to reduce the senseless burden on the peasants. In 1979, the "CCP Central Committee Decision on Some Questions Concerning the Acceleration of Agricultural Development" again stipulated that henceforth and for a rather long period of time, the national grain procurement quotas would remain constant at the 1971-1975 "guaranteed for 5 years" levels, and that beginning in 1979, they would be cut by 5 billion jin. In rice growing areas where grain ration was under 400 jin per capita and in areas where grains other than rice and wheat were grown and grain ration was under 300 jin per capita, exemption of grain procurement would be instituted, and there positively would be no purchase of "overage" grain. At the same time, the points at which taxation begins would be raised. As regards agricultural taxes, the beginning point for rice growing areas is when the grain ration quotas reach 400 jin and for areas growing grain other than rice and wheat, it is 300 jin, with the production teams being the basic unit for making calculations. Production teams in which the per capita grain ration averaged below the beginning point for tax revenues would be exempt from agricultural tax levies. As regards tax revenues from commune and brigade operated enterprises, the beginning point for levying taxes on income of industries and businesses has been increased from the previous 600 yuan to 3,000 yuan. For newly founded commune and brigade enterprises for which the payment of taxes during the initial period of operations would pose difficulties, with the exception of those producing commodities taxed at a high rate such as tobacco, alcoholic beverages, and cotton yarn, exemption from industrial and businesses taxes and from income taxes would be granted for a period of 2 or 3 years. Between 1978 and 1980, all small iron mines, small coal mines, small electric power stations, and small cement plants operated by communes and brigades would be exempted for a period of 3 years from industrial and commercial taxes and from income taxes. These measures substantially solved the problem of excess burdens on the peasantry.

(Xie Zifen) [6200 5261 1164]

#### Opening Up Country Fair Trade

Country fairs have had a long history in China. The document promulgated in 1979 by the CCP Central Committee on accelerating the development of agriculture pointed

out that "Rural country fair trade is a necessary supplementary part of socialist commerce. Commune members have the right to buy or sell at country fairs and to exchange goods, and no unit or person may interfere." Lin Biao and the "gang of four" destroyed the party's rural economic policies, saying nonsensically that the organization of country fair trade was to encourage peasants to take the capitalist road. As a result of the destruction and disturbance caused by their ultraleftist line, country fair trade was banned, and the rural economy damaged. Following the smashing of the "gang of four," rural country fair gradually revived throughout the country. By the end of 1979, there were already more than 36,000 rural country fairs in existence in China, a number close to that of 1965, and the annual amount of money exchanged totaled 17.1 billion yuan, a 36 percent increase over 1978. In addition, some provinces also revived "mountain gatherings," and "large mule and horse gatherings" for the exchange of goods. In accordance with a resolution of the All-China Industrial and Commercial Administrators Conference, country fair trade in large and medium size cities throughout the country was also liberalized.

In order to have country fair trade develop in the proper direction, country fair trade must be placed under the leadership and administration of the state. Regulations provide that only production teams from people's communes, commune members and townsmen may participate in country fairs; government organizations and enterprises may not buy agricultural and sideline products at country fairs. Commodities exchanges are limited to agricultural and sideline products and special local products that are not part of the state plan. Collective grain and edible oil from production teams remaining following fulfillment of unified state procurement quotas and state purchase quotas at higher prices may be sent to market. Cotton may not be sent to market. Illegal speculation in the exchange of goods for sale at a profit and barter of goods requiring coupons will be firmly dealt with.

(Xie Cheng) [6200 3397]

#### Development of Commune Family Sideline Occupations

Permission for commune members to farm a small area of private plots and operate family sideline occupation, provided the collective economy of people's communes is assured an absolutely dominant position, has been a consistent policy of the Chinese Communist Party. Inasmuch as rural productivity in China is still not high, products of collective production are still unable to satisfy the needs of urban and country people, and of industry and foreign trade, and commune member family sideline occupations form an indispensable supplement. In 1978, products from family sideline occupations amounted to one-fourth the total amount of agricultural and sideline products purchased by commercial units throughout the country, and the ratio of some products such as pigs, poultry and eggs was even greater. An overwhelming majority of wild medicinal herbs and some special native products are supplied by household sideline occupations. Development of family sideline occupations is advantageous for the state, the collective, and the individual. But during the period of rampage of Lin Biao and the "gang of four," commune member family sideline occupations were extremely hard hit, and in some places even private plots were taken away, thereby seriously affecting development of the rural economy. After the smashing of the "gang of four," policies for the development of commune member family sideline occupations were again put in place in rural villages. The "Rural People's Communes Work Regulations (Trial Draft)," which was approved in principle by the Third Plenary Session of the 11th Party Central Committee in 1978,

restipulated that commune members could farm private plots distributed by the collective; that a small number of private livestock could be kept in livestock areas and mountain areas; that domestic livestock such as hogs, sheep, rabbits, chickens, ducks, and geese could be raised, and that milch cows and beef cattle could be raised when prerequisites exist. Sideline occupations such as weaving, embroidery, gathering, fishing and hunting, raising of silkworms, and beekeeping could be engaged in. Planting of fruit trees and bamboo around houses was allowed, and such trees would be the property of the commune members in perpetuity. Given the active support of the state and the collective, commune member family sideline occupations again showed considerable development in 1979.

(Xie Cheng) [6200 3397]

#### Each Echelon of Agricultural Administration Leadership Organizations

In order to effectively strengthen leadership for the socialist modernization of agriculture, the Chinese Communist Party and the Chinese government convened the Sixth Meeting of the Standing Committee of the Fifth National People's Congress in February 1979, which made resolutions on establishment of the State Agricultural Commission. The State Agricultural Commission is the State Council's functional organization for directing agriculture, and it simultaneously is in charge of rural work tasks commissioned by the CCP Central Committee. Its main functions are: investigation and study, and proposals for programs and policies on national agricultural production; in conjunction with the State Planning Commission, it assumes unified leadership to formulate long range plans and annual plans for the modernization of agriculture; responsibility for overall planning for State agricultural funds (capital construction funds, investment in industries needed by agriculture, expenses for enterprises used by agriculture, and loans), and for the distribution of various materials; examination and decision making about and guidance of the implementation of major agricultural construction projects of a national character or that are undertaken jointly by some provinces and autonomous regions, or by some departments; coordinating work among agricultural departments, between agricultural departments and other departments, and between central government departments and local jurisdictions; solve major problems in agricultural work; and guide the work of agricultural commissions or corresponding organizations in provinces, municipalities, or autonomous regions. To strengthen leadership in various agricultural departments, the Sixth Session of the Standing Committee of the Fifth National People's Congress also resolved to establish a Ministry of Forestry and a Ministry of Farm Machinery, changing the Ministry of Agriculture and Forestry to the Ministry of Agriculture, and dividing the Ministry of Water Conservancy and Power into a Ministry of Power Industry and a Ministry of Water Conservancy. Subsequently, the Ministry of State Farms and Land Reclamation was established. The State Agricultural Commission was assigned one chairman, and several deputy chairmen. Principle officers in charge in organizations under the State Council, such as the Ministry of Agriculture, the Ministry of Forestry, the Ministry of Water Conservancy, the Ministry of State Farms and Land Reclamation, the Ministry of Farm Machinery, the Central Meteorological Bureau, the main office of the Supply and Marketing Cooperative, and the Bank of Agriculture, all serve concurrently as members of the Agricultural Commission. The State Agricultural Commission also has a number of specialist members and advisors. In conformance with these changes, most functional organizations for directing agriculture in provinces, municipalities, and autonomous regions have changed their former agricultural offices to

agricultural commissions. Generally, prefectural commissioner's offices and county people's governments do not set up agricultural commissions; their organizations responsible for guiding and managing agriculture are usually the agricultural bureaus, livestock and aquatic products bureaus, and water conservancy bureaus. Some prefectures and counties have set up forestry bureaus, sideline industry bureaus, commune and brigade enterprise bureaus, and farm machine industry bureaus.

(Ling Yan) [0407 1484]

#### People's Commune Three Echelon Management Structure

Rural people's communes are socialist economic organizations collectively owned by the laboring masses engaged simultaneously in agricultural, forestry, livestock raising, sideline occupation, and fishery, and in integrated agricultural, industrial and commercial activities. At the present stage, they usually have a three echelon system of ownership in which the production team is the foundation. The three echelons of ownership are the commune, the production brigade, and the production teams. The collective ownership system of the production team is basic; the ownership system of the commune and production brigade is partial. Three-echelon management and three-echelon accounting occurs under the unified leadership of the commune, with the production teams being the basic accounting units. In 1979, China had a total of more than 52,000 people's communes, 700,000 production brigades, and 5.15 million production teams. Production teams were usually around between 20 and 30 households in size.

The management and administration organization of a people's commune is a commune management committee elected by the People's Congress or the Commune Members' Congress. It is responsible for management of agricultural production, capital construction, agricultural machines, commune and brigade enterprises, and administration and management work for the entire commune.

The production brigades are intermediate category 1 organizations in the three-echelon economy of rural people's communes. Their management organization is the production brigade management committee. Under the leadership of the commune, production brigades operate enterprises and facilities collectively owned by individual production brigades, and help production teams improve administration and management to do a good job in production, financial, and distribution work. When necessary, they organize cooperation among production teams to undertake fairly large-scale farmland capital construction, provided that such cooperation is voluntary and produces mutual benefit, and the exchange of labor conforms the equal-value principle.

Production teams are the basic accounting units of people's communes. Their management structure is the production team management committee. Under the leadership of the commune and the production brigade, production teams carry out independent accounting with responsibility for profits and losses, the direct organization of production, organization of the distribution of benefits, and completion of state quotas. Production teams have autonomy in management and control of the lands, mountain forests, grasslands, beaches, water surfaces, livestock, farm implements, and farm machinery that they own.

(Jiang Shufang) [5592 3219 5364]

## Structure of Agriculture and Farming System

### Further Bumper Harvests for China's Agriculture

Following its 1978 triumphs over drought to win a bumper harvest, China's agriculture continued on to win a rather all-around increase in output during 1979. Agricultural statistics for 1979 show the following:

Continued rise in grain production. Total output was 332,115,000 tons, a nine percent increase over 1978. Grain taxation and purchases nationwide increased by more than 4 million tons over the same period during the previous year.

Fairly rapid increase in industrial crops. Cotton output totaled 2,207,000 tons, a 1.8 percent increase over the previous year; oilseeds output was 6,435,000 tons, a 23.3 percent increase over the previous year; sugarcane was 21,508,000 tons, a 1.9 percent increase over the previous year; sugarbeet output totaled 3,106,000 tons, a 15 percent increase over the previous year; jute and ambergi hemp totaled 1,089,000 tons, a 0.1 percent increase over the previous year; silkworm cocoons totaled 271,000 tons, an 18.9 percent increase over the previous year; tea totaled 277,000 tons, a 3.4 percent increase over the previous year; and output of principal fruits such as apples and citrus increased by more than 10 percent.

All-around development of the livestock industry. Pork, beef, and lamb output totaled 10,624,000 tons, a 24.1 percent increase over the previous year; quantity of fresh eggs purchased totaled 835,000 tons, a 50 percent increase over the previous year; and purchases of honey totaled more than 100,000 tons, an 8 percent increase over the previous year. Additionally poultry, milk, hides, and hair showed varying degrees of increased output.

Commune and brigade enterprises progress in the midst of readjustment. Total revenue amounted to 49.11 billion yuan, a 13.8 percent increase over the previous year, and profits amounted to 10.45 billion yuan, an 18.6 percent increase over the previous year.

Steady strengthening of the rural collective economy. The rural people's commune three-echelon economy's income totaled 164.63 billion yuan, a 13.3 percent increase over the previous year. Nationwide commune member income from distributions by the collective averaged 83.4 yuan per capita, a 9.40 yuan increase over the previous year, and a substantial increase also occurred in commune member income from sideline occupations.

During the bumper harvest year of 1979, in the vast numbers of rural villages throughout the land, production developed, the economy became enlivened, the political situation was stable, and the peasants were happy in a panorama of prosperity. Responsible for this excellent situation, looked at in overall national terms the most prominent reasons were: implementation throughout the country of the CCP Central Committee's series of major decisions on hastening the development of agriculture, particularly its two documents on agricultural problems; strengthening of CCP leadership of agriculture; the putting into effect of various policies of the party for rural villages; respect for the autonomy of production teams; adherence to carrying out the principle of distribution according to work; encouragement to commune members to engage in family sideline occupations; increases

in the purchase price paid by the state for agricultural and sideline products; stabilization of requisition grain purchase quotas; strengthening of people's commune administration and management; and general revival and establishment of some form of a system of responsibility for production. All these things greatly aroused the socialist enthusiasm of 800 million peasants, and vigorously advanced development of agricultural production. Furthermore, substantial improvements in agricultural production conditions also were a major element in the bumper harvests. During 1979, all trades and industries in the country, notably industries, increased their support to agriculture. As compared with 1978, chemical fertilizer use increased by about 10 million tons; use of machine power in agriculture increased by 20 million horsepower; use of electricity in agriculture increased by almost 3 billion kilowatt hours, and various degrees of increase also occurred in the use in agriculture of pesticides and herbicides, plastic sheeting, steel, dynamite, and cement. Additionally, in addition to manufacturing equipment for agriculture, commune and brigade enterprises also used close to 3 billion yuan of profits to support agriculture. Furthermore, though some areas had low temperatures in the early part of the season and drought and other natural disasters in the late season during 1979, in an overall sense climatic conditions for agricultural production throughout most parts of the country were favorable, and this too was a reason for the bumper harvest.

(Sheng Yanshi) [6774 0917 0670]

#### Agriculture, Forestry, Livestock Raising, Sideline Production, and Fishery Ratios

China's agricultural production embraces five industries: agriculture (the farm crop planting industry), forestry industry, livestock raising industry, sideline industries (including brigade-operated industries), and fishery industry. Using 100 percent as the total output value of agriculture, forestry, livestock raising, sideline industries, and fisheries, the output value for each individual industry in 1979 was as follows: agriculture was 66.9 percent (83.1 percent in 1952); forestry was 2.8 percent (0.7 percent in 1952); livestock raising was 14.0 percent (11.5 percent in 1952); sideline occupations was 15.1 percent (4.4 percent in 1952), of which brigade operated industries accounted for 12.5 percent; and fisheries was 1.2 percent (0.3 percent in 1952).

Such a proportional relationship results from failure as yet to make full rational use of China's natural resources for agriculture, and indicates a need for readjustment in the internal proportions of agriculture. Throughout the country, in addition to the 1.5 billion mu of cultivated land, there are still 500 million mu of wasteland that are suitable to agriculture. Somewhat more than 3.8 billion mu of land are used for forestry industry of which only somewhat more than 1.8 billion mu are forests. This is 48.6 percent of the area used by the forestry industry. Available grasslands cover a 3.3 billion mu area of which a 2.9 billion mu area is already in use, amounting to five-sixths of the total. Of the available area, lush grasslands amount to less than 600 million mu or 17.6 percent. Medium grade grasslands cover somewhat more than 1.5 billion mu, or 46.2 percent. Desert grasslands account for somewhat more than 1.2 billion mu or 36.2 percent. An additional 700 million mu of grassy mountains and grassy slopes are scattered throughout farming areas and have not been fully used. The ocean area in which fishery can be operated amounts to 7,382,000 mu, of which 1,681,000 mu are in use. This amounts to one-fourth the area available for fishery. The fresh water area available for

fishery. The fresh water area available for fishery is 75,440,000 mu, of which 48,130,000 mu is being used. An additional one-third of the available fishery area has not yet been put to use.

(Zhong He) [6988 0678]

### Internal proportions of the crop cultivation industry

China's crop growing industry is divided into two major types. One type is grain crops including paddy rice, wheat, corn, gaoliang, millet, tubers, and beans. The other type is industrial crops including cotton, oil-bearing crops, sugar, flax and hemp, tobacco, tea, and silkworm mulberry trees. Additional crops include vegetables, melons, and green manure. In a comparison of 1979 with 1952, the ratio of grain crops decreased while the ratio of industrial crops increased.

Structure of sown area. China has 1.5 billion mu of cultivated land, but as a result of multiple cropping, the area seeded to crops in 1979 amounted to more than 2.2 billion mu. Of the total, the area sown to grain crops amounted to 80.3 percent of the total seeded area (in 1952, it was 87.8 percent). The area sown to industrial crops amounted to 9.9 percent of the total sown area (in 1952, it was 8.8 percent).

Speed of development of total output of major products. In a comparison of 1979 with 1952, grain output increased by 102.6 percent for an average 2.7 percent annual increase; cotton output increased 69.3 percent for an average annual increase of 2 percent; oil-bearing crops increased by 53.5 percent for an average annual 1.6 percent increase; sugarcane increased by 202.3 percent for an annual average 4.2 percent increase; sugarbeets increased 549 percent, or an annual average 7.2 percent increase; jute and hemp increased 256.5 percent for an annual 4.8 percent increase; silkworm cocoons increased 119.8 percent for an average annual 3 percent increase; and tea increased by 236.2 percent for an annual average 4.6 percent increase. The above shows that increases in industrial crops such as sugarcane, sugarbeet, jute and ambari hemp, silkworm cocoons, and tea was faster than for grain; however, increases in output of cotton and oil-bearing plants, the most important industrial crops, was slower than for grain.

Quantities of grain, cotton, oil, and sugar relative to population. In 1979, grain averaged 684 jin per capita, a 114 jin increase over the 570 jin of 1952; cotton averaged slightly higher than 4.5 jin per capita, an increase of less than 0.1 jin as compared with 1952; oil averaged 13.3 jin per capita, a 1.3 jin reduction from the 14.6 jin of 1952; and sugar averaged 50.7 jin per capita, a 24.3 jin increase over the 26.4 jin of 1952.

(Zhong He)

### Readjustment in the structure of agricultural production.

In 1979, the policies of "simultaneous development of agriculture, forestry, livestock raising, sideline occupations, and fisheries," and of "taking grain as the key link for all-around development with methods suited to local situations and with a proper amount of centralization" were conscientiously implemented everywhere in China. While continuing strong emphasis on grain output, the vigorous development of industrial crops and production from forestry, livestock raising, sideline

occupations, and fisheries brought about gradual readjustments in the irrational state of the structure of agricultural production. In forestry, great attention was given to the planting of trees for afforestation, building of a shelter forest system in the "three northern regions" was started, and efforts were made to increase the forest vegetation cover rate. In the livestock industry, simultaneous with continued attention to the raising of hogs was an intensification of the building of grasslands, and accelerated development of herbivorous livestock. In sideline industries, in addition to continued development of brigade run industries and the broadening of avenues of production, attention was given to traditional sideline industries. Additionally, in the distribution of land for agriculture, forestry, livestock raising, sideline industries and fisheries, a net decrease of more than 23 million mu was effected in the area planted to crops. Of this, a portion of land not suited to cultivation was converted to development of the forestry, livestock raising, sideline and fishery industries. In the distribution of land for crop planting, the area sown to grain was cut by more than 19 million mu. The area sown to oil-bearing crops, the agricultural product for which development has been slowest, was increased. The actual area planted to cotton, sugar crops, jute and ambari hemp, and tobacco was also reduced.

In the process of readjusting the structure of agricultural production, depending on local natural conditions and economic conditions, each jurisdiction gave attention to building a structure for agricultural production possessing local characteristics. Jiangsu Province gave attention to making the most of the different advantages offered by each prefecture, appropriately increasing the area planted to cotton while scaling down the area planted to grain, and vigorously increasing yields per unit of area. As a result, cotton output in 1979 exceeded 10.06 million dan, an almost 10 percent increase over 1978; the quantities of oil-bearing products, silkworm cocoons, and fattened hogs procured by the State increased more than 10 percent, 20 percent, and 50 percent respectively; and grain output also increased by relatively larger margins. In view of natural conditions such as the soil in the province, Shandong Province vigorously developed production of oil-bearing crops such as peanuts, and not only did peanut output increase by 2 million dan over the previous year for an 11.8 percent rate of increase, but grain output also rose steadily. Taking into account the natural resources in the region, the Nei Monggol Autonomous Region revived its production program of "let livestock be paramount," and numbers of large livestock increased by more than 440,000 head over the previous year, a 7 percent increase; sheep increased by 3.33 million head or a 14.8 percent increase.

After a year of readjustments, the structure of agricultural production in various provinces, municipalities and autonomous regions began to show improvements; nevertheless, in national terms, readjustment is nothing more than a beginning; the irrational state of the structure of agricultural production overall has not yet been basically changed.

(Zhong He)

#### Different farming systems in separate areas

China's territory is vast and its natural conditions differ in thousands of ways; production conditions are also very unbalanced, and the farming systems are diverse

and extremely complex. In general, they may be divided into the following several types.

Predominately one crop a year northern areas. These include most of the Northeast and Northwest China, and the northern part of North China. Major crops are spring wheat, corn and gaoliang, millet, soybeans, potatoes, oats, sugarbeets, and flax. Only one crop is planted in a year, and some land lies fallow. Except for irrigated areas in Northwest China, dryland crops predominate. In the northeastern region, the ratio of rotational cropping of soybeans-gaoliang-millet in a 3 year cycle was formerly quite extensive. In recent years, the area devoted to corn with its quite high output, has been expanded, and since the corn crop, formerly a secondary crop, has now become a main crop, while the soybeans and gaoliang, which had formerly been main crops, have now become secondary crops. In Northwest China, in the Guanzhong area in the northwestern part of North China, in eastern Gansu, in western Honan, and in southern Shandong, one crop of wheat is grown each year (and after 3 or 4 years, a late autumn crop is replanted), and the ground lies fallow during the summer season accumulating the summer and autumn rains, or is rotationally cropped with pasture grass.

Predominately three-crops-every-2 years and two-crops-a-year reas along the Huang, Huai, and Hai rivers. These are China's principal winter wheat, cotton, and miscellaneous grains growing area. Formerly, principally because of water and fertilizer limitations, the potential for increasing multiple cropping was not fully tapped, and in some areas one crop was grown each year, and in some other areas, three crops were grown in 2 years. Now, mostly three crops are grown every 2 years, or two crops are grown each year. The principal formulas for three crops every 2 years are: spring corn (or spring sweet potatoes)-winter wheat-cotton; cotton-winter wheat-corn (or sweet potatoes, millet, soybeans or peanuts). The principal formulas for two crops a year are: winter wheat-summer corn (or sweet potatoes, millet, or peanuts); winter wheat-cotton (intercropped). During recent years, some areas or units where water, fertilizer, and mechanization conditions are good, employed intercropping, transplanting of seedlings, and selection of suitable companion crops to implement a farming system of three plantings and three harvests [in one year].

The Yangtze River Basin Two-Crop and Three-Crop System Area in Which Rice Predominates. In this area, the dominant planting system is rice-rice-green manure, or rice-wheat (or rape, or green manure), and sometimes wheat-cotton. Recent years have seen substantial increase in a three-crop system of rice-rice-wheat (or barley, naked barley, or rape) in some areas.

Areas south of the Wuling Mountains where a triple or multiple cropping system has been installed, under which 2 rice crops are planted as the major crops. These areas include Guangdong, Guangxi, Fujian, and Taiwan provinces as well as the southern regions of Zhejiang, Jiangxi, and Yunnan. Most practice a three-crop system in which rice is the two major crops as in wheat-rice-rice, or tubers-rice-rice, or peanut-rice-rice. There is also a multiple cropping system using two crops of rice with industrial crops or vegetables being intercropped.

Southern hilly and mountainous dryland crop areas. In these areas, little paddy rice is grown. Dry grain crops predominate including corn, potatoes, and grains such as wheat and barley.

(Zong Yuan) [1350 0626]

#### Discussion of the Question of Change in the System in the Rice Growing Areas of the South

In 1979, China's agricultural research units, agricultural education units, agricultural production management units, and economic theory units, conducted discussions on the question of a change in the farming system in southern rice producing areas. The focal point of these discussions was whether or not it was better to grow rice and wheat in two separate crops in a single year, or whether it was better to have a three-crop system in which 2 crops of rice were grown in the middle and lower reaches of the Yangtze River. There were three general views.

The first view held that following change of large areas from a two-crop system to a three-crop system with two crops of rice, because of the long period of time during which the fields would be inundated with water, because of reduction in organic fertilizer, and because of the need to plow and harrow in sodden conditions, the quality of the soil would become poor, the plow sole would thicken, its permeability would become poor, ability to release nutrients would be low, and the soil would become sticky and leathery. When 2 crops of rice were grown instead of one, the seedlings for the early rice crop would be more prone to damage from low temperatures, and during the ripening stage high temperatures would force ripening prematurely, while the late rice crop would be prone to damage from the cold dew wind. When winter wheat was replaced with a crop of barley and a crop of naked barley, outputs would decline and economic value would be lower. Following change from geng rice to early xian, the rate of yield would fall. This plus the greater use of seeds, greater applications of fertilizer, and greater use of manpower for three crops as opposed to two crops would mean greater costs and a greater intensity of labor, which would not be worthwhile in any final accounting.

Another view maintained that changing the rice-wheat double cropping system to a triple cropping system consisting of 2 rice crops is a successful experiment in increasing the land utilization coefficient in places with a dense population and relatively little available land. The change is basically appropriate for the existing conditions of certain localities and would play a major role in promoting grain output. The problems that occurred in the development of a three-crop system with two crops of rice were problems in the course of progress and problems in making further improvements; one could not flinch when encountering some difficulties, but rather it was necessary to actively overcome difficulties through practice and create the conditions for solving problems.

Still another view held that in areas south of the Yangtze River heat conditions were good, the growing season long, and rainfall copious; most areas could grow two crops of rice and one crop of winter crops in an annual three-crop system. The key lay in the formation of a proper proportion between a two-crop system employing a crop of rice and a crop of wheat, and a three-crop system in which rice was two of the crops, in accordance with the prevailing conditions and local situations.

There could be no "arbitrary method" for all situations. Even a single production unit should be allowed to have more than one crop system and planting methods to be used. This view also advocated active experimentation and a conscientious summarization of experiences to solve the conflicts in tight scheduling of seasons and use versus nurture of the soil that a three-crop system of rice-rice-wheat would carry in its wake, as well as the deterioration of the physical properties of the soil, and the imbalance among water, fertility, air, and heat resulting from the protracted immersion in water of the rice fields that a planting system of long term growing of rice-rice-green manure would entail.

(Zhong Yuan) [1350 0626]

#### Output of China's Major Farm Products

Product	1949	1952	1978	Units: 10,000 tons; 10,000 head		
				Output	Increase over previous year (%)	Taking 1949 as 100
Grain	11,320	16,390	30,475	33,211	9.0	293.4
Cotton	44.5	130.4	216.7	220.7	1.8	496.0
Peanuts	126.8	231.6	237.7	282.2	18.7	222.6
Rapeseeds	73.4	93.2	186.8	240.2	28.6	327.2
Sesame	32.6	48.1	32.2	41.7	29.5	127.9
Jute & ambari hemp	3.7	30.6	108.8	108.9	0.1	2,943.2
Mulberry silkworm cocoons	3.1	6.2	17.3	21.3	23.1	687.1
Tea	4.1	8.3	26.8	27.7	3.4	675.6
Sugarcane	264.2	711.6	2,111.7	2,150.8	1.9	814.1
Sugarbeets	19.1	47.9	270.2	310.6	15.0	1,626.2
Tobacco	4.3	22.2	105.3	80.6	-23.5	1,874.4
Aquatic Products	45	167	466	431	-7.5	957.8
Large animals (year end numbers)	6,002	7,646	9,389	9,459	0.7	157.6
Hogs (year end numbers)	5,775	8,977	30,129	31,971	6.1	553.6

#### Modernization and Mechanization of Agriculture

##### Discussion of Agricultural Modernization

In 1979, the State Agricultural Commission, the State Scientific Commission, and the Chinese Academy of Sciences held work conferences and forums in the agricultural modernization comprehensive scientific experiment base counties of Wuxi County, Jiangsu Province, and Luancheng County, Hebei Province. The Chinese Agricultural Society established the Agricultural Modernization Research Society to organize experts in pertinent disciplines for several forums and discussions, which was able to work with the three northeastern provinces to convene the Northeast

Region Agricultural Modernization Academic Discussion Meeting at Harbin. Liaoning, Jilin, Heilongjiang, and Zhejiang provinces and Shanghai Municipality also convened agricultural modernization academic discussion meetings. RENMIN RIBAO started a special column titled, "Discussion of Thoughts on Farming," and GUANGMING RIBAO started a special column titled, "Discussion of Agricultural Modernization." Some periodicals and regional journals also printed numerous discussion articles.

1. The Agricultural Modernization Conception. In any discussion of this subject, people commonly talk about using modern industry, modern science and technology, and modern scientific management methods to equip agriculture so that antiquated traditional agriculture will be transformed into modern agriculture possessed of the advanced standards of the modern world. The modernization of agriculture, including the modernization of every link in agriculture, forestry, livestock raising, sideline occupations and fishery production, management, as well as the processing, storage, transportation, and marketing and sale of products, is a process of technological transformation and economic development with broad ramifications, and is, at the same time, a relative concept in development.

Some believe that natural forces are a major factor, depending on the characteristics of agricultural production. Agricultural modernization is a multiple process that bears on the broad fields of natural resources, economic development, population, and the social system. The conception of agricultural modernization ought to be: application of modern scientific theories for the steady realization of an effective combination of natural forces, techniques, and economics for the rapid development of productivity. This conception should seek to build a highly efficient agricultural ecological structure and an economically effective technical system, maintaining a proper state of affairs in regard to the natural environment, and with the production system of the entire national economy for the combination forward development of foodstuffs, fibers, and energy.

2. The Hallmarks of Agricultural Modernization. There are two basic views of the major hallmarks. One such view holds that in determining whether a country's agriculture is or is not modernized, the major indication is the productivity of agricultural labor. The higher the productivity of agricultural labor, the more advanced the levels of agricultural productivity, and the more solid the foundation on which development of the entire national economy depends. The modernization of China's agriculture, as is the case with most countries of the world, depends largely on increasing the labor productivity rate in agriculture. Another view holds that in China with its dense population relative to available land, land is the fundamental means of production parameter, and the greater the agricultural products from the further production process in agriculture and from per unit areas of land, the more the needs of the people's livelihood and of the development of the national economy as a whole are satisfied. Consequently, this view emphasizes that the basic task in the modernization of Chinese agriculture is increasing per-unit yields and that the soil productivity rate is the main criterion of the modernization of Chinese agriculture.

Some people feel that to take a single area touched by the modernization of agriculture and use it as a criterion for expressing the degree of modernization of agriculture is unscientific, and that a whole series of indicators should be used, as for example an indicator system that includes production efficiency, foodstuffs quality, building of the environment and the economic structure as the only way to

reflect in a comprehensive way the level of agricultural modernization. For production efficiency, at least four indicators would be required: rate of soil productivity, rate of labor productivity, utilization rate for capital, and energy utilization efficiency.

3. Basic Ingredients of Agricultural Modernization. Formerly these ingredients were said to be mechanization, electrification, bringing of all farmland under irrigation, and extensive use of chemical fertilizers and other farm chemicals. In the course of discussions, some proposed inclusion of superior varieties, and making a garden of the earth. Some also proposed adding regionalization, specialization, and socialization, etc. Some saw the ingredients of agricultural modernization to encompass five -izations: regionalization of production, scientification of methods, mechanization of operations, socialization of production, supply, and marketing, and businesslike conduct [enterprisization] of management.

Many people felt that the ingredients of the modernization of agriculture are wide-ranging, and even a score or several score of -izations would not fully encompass the subject. But in terms of their nature, these ingredients may be divided into three categories: One is the modernization of production methods and production conditions such as mechanization, electrification, bringing of all farmland under irrigation, and making a garden of the earth.

The second is the modernization of production technology such as the use of superior varieties, chemical fertilizers, pesticides, and herbicides, as well as various advanced techniques in cultivation and planting, in feeding and breeding. The third is the modernization of production administration and management, as for example: a rational pattern and planning for agriculture, forestry, and livestock raising; rational organization of production forces; regionalization and specialization of agricultural production; unified agricultural, industrial, and commercial operations; suitable development of production forces; improved systems and methods in administration and management; and readjustment of production relationships.

Discussions were also conducted on the position and role of mechanization in the modernization of agriculture. One view held that mechanization was the linch-pin in the modernization of agriculture; it is not only the main way to increase the labor productivity rate, but also a major means for increasing per-unit yields. Superior varieties, chemical fertilizers, pesticides and herbicides, and water conservancy all require machines, and there can be no talk of the modernization of agriculture in the absence of machines. Consequently emphasis should first go to intensive mechanization in order to hasten agricultural modernization. Another view held that across-the-board mechanization of agriculture was a distant combat goal, but currently China's industrial level is low, capital and materials resources limited, some machinery costs high, and labor forces abundant for the most part, so emphasis should be placed on superior varieties, chemical fertilizers, pesticides and insecticides, and water conservancy, with mechanized farming being suited only for special selected areas.

Many people felt that the ingredients of the many aspects of agricultural modernization are interrelated, mutually restrictive, and mutually reinforcing, requiring both overall planning taking all factors into consideration and comprehensive arrangements, and also requiring adaptation of general methods to specific times

and specific locales, taking firmly in hand those weak links affecting the development of production for mutual advancement and steady increases in production efficiency.

4. What is Chinese style agricultural modernization? In the course of discussions, everyone acknowledged that in an exploration of the issue of how to modernize China's agriculture, they should not stop at a level of understanding based on a simple description of modern agriculture in foreign countries, but must take account of China's realities and scientifically analyze China's concrete conditions and basic characteristics. They should diligently summarize the lessons and the experiences of the past 30 years in the development of agricultural production, be adept at studying and absorbing advanced foreign experiences and, through comprehensive scientific experiments in the modernization of agriculture in different kinds of regions, they should explore avenues for the modernization of agriculture suited to China's circumstances and characteristics. China is a densely populated socialist country, and the modernization of its agriculture should be the building of a large-scale socialist agriculture that has comprehensively developed agriculture, forestry, livestock raising, sideline occupations, and fisheries, that is equipped with modern science and technology, and that engages in integrated operation of agriculture, industry, and commerce.

(Tao Yuechong) [7118 1471 1504]

#### National Conference on Agricultural Natural Resources Survey and Agricultural Zoning

The National Agricultural Natural Resources Survey and Agricultural Zoning Conference was held in Beijing from 3 to 7 April 1979. This conference was jointly convened by the State Agricultural Commission, the State Science Commission, the Ministry of Agriculture, and the Chinese Academy of Sciences.

The conference acknowledged that in China with its vast territory and abundant resources, where regions differ greatly one from another, a survey of natural resources for agriculture and agricultural zoning is a major fundamental task for the rational development and use of natural resources in agriculture, for planning suited to local situations, for guiding agricultural production, and for bringing about the socialist modernization of agriculture in China. The conference affirmed the achievements made in this regard since the time of the founding of the People's Republic. As a result of the destruction and disturbances caused by the ultra-leftist line of Lin Biao and the "gang of four," this work was completely negated and interrupted for a long period of time. Consequently it is necessary to take effective measures to actively get this work rapidly underway and continue for a long time.

The conference discussed and amended the "Essentials of the 1979-1985 Agricultural Natural Resources and Agricultural Zoning Study Plan," and made the following deployments in the work emphasis over the next 2 or 3 years: In the field of the survey of natural resources for agriculture, the first is a survey of soil resources; the second is the organization by pertinent units, in conjunction with provinces and autonomous regions, of multi-discipline forces to conduct comprehensive studies and to come up with rational programs for development as quickly as possible for regions in which conflicts are currently fairly prominent for development and use of resources (such as those in the loess highlands, the Sanjiang

Plain, Hainan Island and Xishuangbanna, and coastal beaches); the third is a general soil survey; fourth is the organization of forces to make scientific surveys and to provide a protection program for natural preserves that have been built or are planned for building throughout the country. In the field of agricultural zoning, in order to satisfy the urgent needs of current planning and guidance of agricultural production, the following are necessary: organize, under the support and coordination of appropriate departments, some crack scientists and technicians familiar with the situation for analysis and study of existing data to provide preliminary and concise nationwide comprehensive zoning for agriculture and zoning for mechanization of agriculture; various provinces, municipalities and autonomous regions may, according to their own real situations and to the methods mentioned above, propose within the next 1-2 years preliminary comprehensive zoning plans for agriculture and for farm mechanization for their own areas; simultaneously make deployments for each country to summarize its land resources and soil surveys to prepare by stages before 1985 a comprehensive zoning plan for agriculture and a comprehensive zoning plan for the mechanization of agriculture for each county.

Following approval by the State Council, a national agricultural natural resources investigation and agricultural zoning committee was established, and a national agricultural natural resources investigation and agricultural zoning office was set up within the State Agricultural Commission in order to intensify leadership of this work. Director of the National Agricultural Natural Resources Investigation and Agricultural Zone Committee is Wang Renzhong [3769 0117 6850]; deputy directors are Zhang Pinghua [1/28 1627 0553], Tong Dalin [4547 1129 2651], Zhao Beike [6392 0554 0460], and He Kang [0149 1660]; Secretary general is He Kang (concurrently).

(Zhu Xinquan) [2612 9515 3123]

#### Agricultural Modernization Comprehensive Scientific Experimental Base

In order to meet the needs of the four modernizations and to implement the tasks provided for in "essentials of the 1979-1985 Agricultural Natural Resources and Agricultural Zoning Study Plan," the State Science Commission, the State Agricultural Commission, the Chinese Academy of Sciences, the Ministry of Agriculture, the Ministry of Forestry, the Ministry of State Farms and Land Reclamation, and the State Aquatics Products Bureau began in 1978 to establish comprehensive scientific experiments bases in 14 different places for modernizing agriculture (forestry, livestock raising, fisheries, and tropical crops). These are: 1. in Hunan Province, the Taoyuan County Agricultural Modernization Comprehensive Scientific Experiments Base; 2. in Hebei, the Luancheng County Agricultural Modernization Comprehensive Scientific Experiments Base; 3. in Heilongjiang Province, the Hailun County Agricultural Modernization Comprehensive Scientific Experiments Base; 4. in Heilongjiang Province at Youyi (Friendship) Farm, the Fifth Branch Farm Agricultural Modernization Comprehensive Scientific Experiments Base; 5. in Jiangsu, the Wuxi and Wu County Agricultural Modernization Comprehensive Scientific Experiments Bases; 6. in Sichuan, the Guanghan County Agricultural Modernization Comprehensive Scientific Experiments Base; 7. in Heilongjiang, the Dailing Forestry Modernization Comprehensive Scientific Experiments Base; 8. in Nei Monggol, the Dengkou "Three Norths" Shelter Forest Modernization Comprehensive Scientific Experiments Base; 9. in Jiangxi, the Fenyi Southern Rapid-Growing High-Output Timber Forest Modernization Comprehensive Scientific Experiments Base; 10. in Guangxi, the Daqingshan Tropical and Semi-tropical Precious Special-Use Tree Species Modernization Comprehensive Scientific Experiments Base; 11. in Nei

Monggol, the Zhuri He Livestock Farm and the Kezuohou Banner Grasslands Livestock Modernization Comprehensive Scientific Experiments Base; 12. Tai Lake Aquatic Products Resources & Propagation Modernization Scientific Experiments Base; 13. the Bohai Aquatic Products Resources & Propagation Modernization Scientific Experiments Base; 14. in Guangdong, the Hainan Tropical Plants Modernization Comprehensive Scientific Experiments Base.

The fundamental task of these bases is: In accordance with characteristics of the bases, organization of research forces from many disciplines and many specialties using advanced techniques and equipment and applying scientific production methods and management methods in the realm of integrated agriculture, industry, and commerce to launch comprehensive scientific experiments to explore concrete ways, means and laws to provide a set of scientific and technical measures, administrative and management measures, and proposals and data for the regulation of pertinent economic policies and systems to hasten agricultural development in these areas and gradually effect the modernization of agriculture.

On the basis of comprehensive survey and study of soils, ground covers, climate, water conservancy, agricultural crops, and the agricultural economy, through the formulation of agricultural zoning, and taking into consideration of current production, each of the comprehensive scientific experiments bases for scientific experiments has set up various kinds of research bases to carry out scientific experiments within a fairly large sphere, having in mind the entire county (or an entire prefecture), but taking in hand the station to begin with, enlarging experiments from a site to an area, and promoting them. Many stations did a large amount of work in scientific experiments and in building up the bases and made definite accomplishments.

(Zhu Xinquan) [2612 9515 3123]

#### Steady Increases in the Degree of Agricultural Mechanization

After 30 years of development, China's rural villages now can boast a fairly good number of tractors and associated farm implements. The level of agricultural mechanization is steadily rising. As of the end of 1979, farm machinery power totaled about 180 million horsepower of which machines for drainage and irrigation accounted for about 71,221,000 horsepower, an increase of 5,646,000 horsepower over the previous year. Large and medium size tractors numbered 667,000, a 110,000 increase over the previous year. Hand-held tractors numbered 1,671,000, a 298,000 increase over the previous year; machine-drawn farm equipment numbered 1,313,000 items, combines 23,000, farm trucks 97,000, and water wells fitted with electric pumps 2.1 million.

In order to properly take care of and use these machines, China has set up 46,000 people's commune farm machine management stations in 87 percent of all communes. Commune and brigade, and state farm machine supervision and operating personnel number 8 million. In 1979, the machine cultivated area amounted to 630 million mu or 42.4 percent of the total cultivated area; the machine-sown area amounted to 230 million mu of 10.4 percent of the total area sown; the machine harvested area amounted to 57.6 million mu or 2.6 percent of total harvested area; the effectively irrigated area amounted to 675 million mu of 45.2 percent of the total cultivated area; and quantity of electricity used was 18.9 kilowatt hours per mu of cultivated land.

The steady increase in the level of farm mechanization has played an important role during the busy seasons in agriculture, in planting crops at the right times, in bolstering capabilities for combating natural disasters, in improving the conditions of agricultural production, in increasing the productivity of labor, in releasing workforce for the development of diversified farming and for commune and brigade run enterprises; it has vigorously promoted increased output and increased earnings from agriculture. In the northeast, use of seeding machinery to plant seeds not only effected a saving in seeds, but also shortened planting time from 30-40 days to 10-15 days to achieve on-time planting and earlier ripening to avoid early frost and win a bumper harvest. In 1978 when Jiangsu, Hubei, Anhui and 8 other provinces had a drought such as rarely occurs, they started up diesel engines with a total power of more than 21 million horsepower and electric motors and irrigation machines with 10 million kilowatt capacity to divert and pump more than 170 billion cubic meters of water, the equivalent of the total volume of flow of 3 years in the Yellow River, to win a nationwide bumper harvest with an increased grain output of more than 40 billion jin in a drought year. The First Brigade of Yueqi Commune in Wu County on the shores of Tai Lake had 977 horsepower in electric motors for farm use in 1979, for an average 1 horsepower for every 2 mu. The proportion of labor force engaged in agriculture relative to total labor force declined from a pre-mechanization 90 percent in 1970 to 50 percent. In 1979, its total output value from agriculture, industry, and sideline occupations was 1.2 million yuan, of which the output value from industry and sideline occupations amounted to 62.5 percent. Grain yields were 1,879 jin per mu, a 565 jin increase over 1970. Commune member distributions were 280 yuan per capita, a 151 yuan increase over 1970.

(Lin Qihui) [2651 0366 6540]

#### Development of Farm Machine Industry in the Midst of Readjustment

The farm machine industry is a newly developed industry that was founded after the establishment of New China. It began from nothing to develop very rapidly. By the end of 1979, farm machine manufacturing enterprises above the county level numbered 1,920 nationwide, employing 1.06 million people, owning 189,000 machine tools of various kinds, and having fixed assets of 8.28 billion yuan. In addition, there are more than 2400 county farm machine manufacturing and repair plants, employing 480,000 people and with fixed assets of 2.3 billion yuan.

Though farm machine industries have blossomed everywhere and developed very rapidly since the founding of the People's Republic, most such enterprises are "small but complete," with numerous sites but small output and low levels of specialization. In 1979, the farm machine departments diligently put into effect the national economic program of "readjustment, reform, restructuring, and improvement," convening in March and October two nationwide farm machine work conferences for conscientious study of problems in readjustment of the farm machine industry, and drawing up the "Readjustment Program for the Farm Machine Industry (Trial Draft)" and the "Readjustment Plan for the Farm Machine Industry." They began to readjust the farm machine industry, organizing farm machine enterprises for development in the direction of specialized large scale production.

In the process of readjustment, the farm machine departments gave special attention to quality, to matched equipment, and to technical services, launching a pervasive campaign to increase output while practicing thrift, and making new progress.

In 1979, total output value of the farm machine industry stood at 9.024 billion yuan; the industry produced 126,000 tractors, 318,000 hand-held tractors, 27,480,000 horsepower in internal combustion engines, 820,000 kilowatts of internal-combustion electric power generating units, 630,000 water pumps for agricultural use, 4500 grain combines, 129,000 tractor-drawn plows, harrows, and seeders, and 112,000 tractor-drawn farm wagons, thus overfulfilling the state plans. Of these items, tractors, power generating units, grain combines, and tractor-drawn farm wagons showed a 10-30 percent increase in output over 1978.

(Lin Qihui)

#### Improvement in Farm Machine Quality

In 1979, Chinese farm machinery departments and manufacturing units moved product quality to the first position, and using readjustment and bolstering of enterprise management. They promoted the advanced experiences of "overall quality control" of the Beijing Internal Combustion Main Plant, eliminating from the production process the sources producing substandard goods, and quality of farm machines increased remarkably. According to incomplete statistics from 22 provinces, municipalities, and autonomous regions, of 531 farm machine products checked, 508 met or surpassed specifications. Spot checks showed an average of 96 percent of complete sets of machines met standards. The rate in meeting specifications for major spare parts averaged 93 percent. Of 75 products produced at 46 key enterprises, 74 met specifications.

All farm machinery and equipment plants selected for checking had implemented plans for improving quality, with 14 products reaching first quality or superiority quality. In an assessment and comparison of superior quality products, nine farm machine firms were awarded silver medals by the state for seven different products as follows: the Changzhou Diesel Engine Plant and the Wuxi Diesel Engine Plant for the production of the S195 type diesel engine; the Changzhou Tractor Plant and the Wuxi County Tractor Plant for production of the Dongfeng-12 type hand-held tractors; the Shenyang Small Tractor Plant for production of the 518-12 type hand-held tractors; the Wuxi Power Machinery Plant for production of the 261-P waste-gas turbine superchargers; the Chengde Crankshaft and Connecting Rod Plant for its production of the Dongfanghong-75 crankshaft; the Hailongjiang Farm Machinery Plant for its production of the L-5-35 heavy five-shape plow; and the Xi'an Farm Machinery Plant for its production of a 24-row fertilizer spreader and seeding machine.

(Lin Qihui)

#### Intensification of the "3-izations" in Farm Machinery Work

The "3-izations" of farm machinery means standardization of quality, serialization of types of products, and universalization [interchangeability] of parts for farm machinery. In order to change the situation of poor quality machinery and a welter of types, farm machinery firms have intensified their "3 -ization" work. In 1979 they formulated programs and tasks for the "3 -izations" in a 3 year period of readjustment, making unequivocal regulations for the establishment and perfection of organizations responsible for the management of standardization as well as personnel allocations at all echelons. They formulated the "Standardization Work

"Regulations for Farm Machinery Research Units," and the "Standardization Work Regulations for Farm Machinery Enterprises," which following approval by the Ministry of Farm Machinery, became trial regulations promulgated for use. They formulated a 1979-1981 farm machinery standardization work plan providing that within this 3 year period 66 national standards and 245 ministry standards would be formulated and revised. In 1979 they substantially completed their current year's task of formulating standards for farm machinery.

In 1979 they put into effect unified national blueprints for diesel engines and tractors to raise the "3-ization" levels for products. Hubei Province changed its 90 series diesel engines to 95 series, and changed its 20 horsepower and 40 horsepower tractors to 25 horsepower and 50 horsepower in order to turn out products in accordance with unified national blueprint. In accordance with the principle of priority, and in a spirit of self-reliance and arduous struggle to complete the job, they completed their remodeling task in less than a year of effort. Following model changes, not only was the level of the "3-izations" increased, but quantity and quality of output was also raised. Output of diesel engines models 295 and 495 attained first quality standards, and use of these two kinds of diesel engines on 25 horsepower and 50 horsepower tractors was much welcomed by the peasants.

(Zhang Keqin) [1728 0460 0530]

#### Establishment of Farm Mechanization Service Company

In order to bring under control of a single department the supply of farm machines and spare parts, machinery maintenance and repair, and the imparting of technical knowledge so as to increase the in-condition rate and utilization rate of farm machinery so they can play a full role in agricultural production, the Ministry of Farm Machinery decided to set up a Farm Mechanization Service Corporation on the foundation of the former Farm Machinery Supply Company.

The Chinese Farm Mechanization Service Corporation was established in March 1979. Next, pilot farm mechanization companies were set up one after another in Tong County of Beijing Municipality, Ye County in Shandong Province, and Yixing County in Jiangsu Province. At the same time, some counties, municipalities, and autonomous regions selected one or more counties, depending on local situations, for the operation of pilot programs.

Though the tryout periods of the farm mechanization service companies was not long, results were quite good. Cases in point were: improvements in quality of service from what it had been; more prompt supply than in the past, and increased supply of different merchandise. They organized a technical service teams, increasing service in the maintenance of farm machinery and in passing on technical knowledge, both promoting agricultural production thereby, and reducing overstocking in the companies' warehouses. In the area of administration and management, they reduced the number of links, accelerated the turnover of funds, and reduced expenditures. Nevertheless, some problems still exist. The Chinese Farm Mechanization Service Corporation is planning further pilot programs in a continued search for experience.

(Zhu Bian) [2612 6708]

## Development of Rural Village Methane Gas

The May 1979 National Methane Gas Officer Directors' Conference proposed a methane gas development program calling for "stronger leadership, active promotion, continuous development, and steady progress." In September of the same year, the State Council approved and relayed the "Report on Several Problems in Current Rural Village Development of Methane Gas" issued jointly by the State Economic Commission, the State Science Commission, the State Agricultural Commission, and the Ministry of Agriculture; established a national methane gas development leadership group; and considered the development of methane gas as a strategic measure and as an energy policy closely interrelated to the four modernizations. Each province (and autonomous region) likewise followed suit in establishing a methane gas office, convened methane gas work conferences, diligently summarized past lessons of experience in methane gas matters, gave serious attention to quality in the building of methane pits, intensified methane research, and looked after methane pit management. By the end of 1979, more than 7 million methane pits with a capacity of 8 to 10 cubic meters each had been built nationwide, and about 30 million commune members were using methane gas. During the past 2 years, some communes, brigades, and state agricultural and livestock farms have built more than 36,000 fairly large capacity methane pits. Methane is being used to run internal combustion engines, for the pumping of water, the milling of rice, the grinding of flour, threshing, pulverizing, the generation of electricity, and the drying of agricultural and sideline products at methane power stations numbering more than 700 with a total power of more than 9,200 horsepower. Methane electric power generating stations number more than 600 with an installed capacity of more than 5000 kilowatts.

The development of methane gas in China's rural villages has more and more aroused close attention internationally. In 1979, 10 groups numbering more than 90 people made special trips to China for the purpose of visiting and examining methane gas production. China ran a methane gas lecture and study class on methane for the Environmental Planning Office of the United Nations, and has trained 21 methane technicians for more than 20 countries. By special arrangement with United Nations University, Chinese experts wrote teaching materials on China's methane gas. The United States, West Germany, the United Kingdom, and the United Nations Environmental Office have invited Chinese methane experts to attend international discussion conferences on energy that they have sponsored.

(Tu Jiabao) [1458 1367 1405]

## Soil, Fertilizer, Seeds, Plant Protection

### Improving Low Yield Fields

China has about 500 million mu of low yield fields amounting to about one-third of its cultivated land area. This consists mostly of: saline-alkaline soil in Northwest, North and Northeast China and in seacoastal regions; the red and yellow clay fields with low fertility, the cold waterlogged fields, salt-acidic fields, and poor rice fields of the south; and the low-lying waterlogged land (including marshes), infertile slopes, sandy soils, and heavy clay soils in every region. Of these, the saline-alkaline soils cover a 300 million mu area (including saline-alkaline wastelands), and more than 100 million mu are distributed in cultivated areas. These areas are plains and basins where the topography is generally flat,

and the soil layer quite thick making the land suitable for agricultural mechanization and irrigation. In 12 southern provinces and autonomous regions, red soils amount to 12 percent of China's total area. Cultivated red soil land now amounts to more than 500 million mu, amounting to about 36 percent of the country's cultivated land. Of this total, more than 80 million mu consists of low yield fields, and another more than 370 million mu of barren mountains and barren hills with red soil is suitable for forests, livestock raising, or the development of industrial crops, and nearly 1 billion mu of grassy mountains or grassy range is suited for the raising of livestock. This area is located in the tropics and semi-tropics where the land is vast, the population dense, resources abundant, the climate warm, rainfall copious, and the frost-free period long, a vast storehouse of production potential with natural advantages for the development of agriculture and industrial crops. China's low-lying waterlogged area amounts to about 60 million mu, most of it on the Songliao Plain, in the Hai River Basin, on the plain north of the Huai River, and on southern lakeshore areas. China also has 60 million mu of sandy soil, mostly distributed in the northwest and in seacoast areas and along rivers.

Output from the aforementioned low yield fields is very low. Grain yields are usually only between 100 and 200 or 300 and 300 jin per mu. Since Liberation, in the process of undertaking capital farmland construction and giving attention to comprehensive treatment of low yield fields, the broad masses of peasants have accumulated quite a bit of experience and have made definite achievements. In the case of the saline-alkaline lands, a great deal of experimental research has been done for the improvement of saline-alkaline lands during recent years by large numbers of scientists and technicians and the peasant masses. They have adjusted general methods to local situations to undertake improvements, gaining much experience and progress under different conditions. In North China, for instance, they have taken the road that stresses draining of water, links agriculture, forestry and water together, and takes comprehensive action against drought, waterlogging, and alkalinity. They have had quite good results from putting in order main watercourses for the drainage of water, improving the water drainage system in fields, adopting coordinating measures on well, ditches and channels for the rational use of drainage and irrigation. Good results were also achieved in improving the cultivation of rice and warping, leveling the land, and energetic planting of green manure. In the south, it was the same in the comprehensive treatment of red soils. In Jinxi County in Jiangxi, for example, where red soils account for 95 percent of the county's soil, the area had formerly been one of low yields for grain. Since 1958, the county has vigorously improved the red soil and made comprehensive use of it, turning large tracts of infertile, acidic, dry, and sticky red soil into fertile fields. Barren hills and bald mountains have become good places with luxuriant forests, and bumper grain output where agriculture, forestry, livestock raising, sideline occupations, and fisheries flourish. In 1979, Jinxi County's total grain output was more than double that of 1958 reaching 550 million jin with yields averaging 917 jin per mu. Cotton output totaled 31,000 dan, and great development also took place in oil-bearing crops, tea, citrus fruit, mulberry, and other industrial crops, as well as in forestry, livestock raising, and fisheries. The people in the county averaged per capita incomes of 117 yuan. Additionally, a certain degree of progress was also made in improving low-lying waterlogged fields and sandy land. By the end of 1979, about 180 million mu of land throughout the country had been improved to one degree or another.

(Zhang Shixian [1728 0013 6343] and  
Xiang Hongyi [0686 3163 1355])

## The Make-up of China's Agricultural Fertilizer

A remarkable change has taken place in the composition of China's agricultural fertilizer since the founding of the People's Republic. Before Liberation, mostly organic fertilizer was used, and chemical fertilizer was extremely scant. After Liberation, the chemical fertilizer industry developed very rapidly, and growth has been particularly rapid during the past few years. In 1979, the quantity of chemical fertilizer used was 160 times that of the period immediately following Liberation, with approximately an average 7.3 kilograms per mu of cultivated land being used. The make-up of fertilizer has gradually changed from the former "mostly farmyard manure and compost with some commercial fertilizer" to "mostly organic fertilizer and a mixture of organic and inorganic fertilizer."

Organic fertilizer is the main fertilizer used in Chinese rural areas. It comes from a wide number of sources and is of numerous kinds; it is readily obtainable locally and can be accumulated for use locally. There is a great difference in quality of various kinds of organic fertilizer, and amounts spread on fields vary from 2000 to 3000 jin per mu to upwards of 10,000 jin per mu. In the high rice output areas south of the Yangtze River, the area of planting and use of green manure is very great, and in the provinces of Jiangsu, Zhejiang, Hubei, Hunan, and Jiangxi, green manure is used at a rate averaging one mu of green manure per two or three mu of cultivated land. In the north, the green manure area is less, but is under active development.

In 1979, most of the inorganic fertilizer used was chemical fertilizer and trace element fertilizer. Most of the chemical fertilizer was nitrogenous fertilizer, which amounted to 73 percent of the total amount and included urea, ammonium hydrogencarbonate, and ammonia water. Second was phosphate fertilizer, mostly calcium superphosphate, and calcium magnesium phosphate fertilizer. Only since the 1970's has potassium fertilizer been promoted for use in some southern provinces (or autonomous regions), but the ratio is very small, and it is mostly potassium chloride or potassium sulfate. In addition, compound fertilizer accounts for 2 percent. Use of trace element fertilizer has aroused serious attention and experimental demonstrations over a fairly large area were undertaken in 1979.

(Zhang Siming) [1728 0934 2494]

## Increased Applications of Organic Fertilizer

China's working people have been in the habit of using organic fertilizer since ancient times. Human and animal dung, barnyard manure, compost, waterlogged compost, miscellaneous indigenous manure and green manure have been the major organic fertilizers widely used in China's rural villages. In recent years, use of methane gas fermented fertilizer has also developed as have humic acid fertilizers and the return to the fields of stems and stalks. As a result of long experience in production, abundant experience has been summarized on the accumulation, concocting, growing, raising, and use of organic fertilizers.

Development of green manure production is one important way of using the soil to nourish the soil to increase its organic content. The growing and use of green manure has a more than 3000 year history in China. In the period immediately following liberation, the area planted to winter green manure amounted to only somewhat more than 30 million mu, but by 1979 it had grown to around 110 million mu.

Everywhere the planting of green manure as an individual crop or in intercropping, companion cropping, transplanting, or mixed cropping has been constantly improved and perfected, creating a fine situation under which green manure is grown and used year round by "planting it every year, intercropping it with all crops, growing it in every season, and use it on every mu." The "three waters and one duckweed" (water cabbage [*Pistia Stratiotes*], water hyacinths, water peanuts, and duckweed) are the aquatic green manures that have been grown for many years in South China; and they serve both as cattle feeds and as fertilizers. Fine duckweed is a new variety of duckweed, which multiplies easily, is handy, propagates rapidly, and has high output. In 1979, it was grown and used over a total area of more than 3.6 million mu in 13 southern provinces, municipalities, and autonomous regions.

(Zhang Xiaohua) [1728 1420 5478]

#### Development of Organic Fertilizer

Use of scientific breeding and propagation of various beneficial micro-organisms in the soil, and inoculation of the soil with microbes for use as fertilizer is commonly called micro-organic fertilizer. Such fertilizers have been developed from scratch in China.

Bacterial fertilizers are organic fertilizers that contain large amounts of living micro-organisms including root nodule bacteria, nitrogen fixing bacteria, organic phosphate germs, antibiotic fertilizers, and nitrogen fixing blue algae. Through the use of these fertilizers, the more commonly used organic fertilizers and chemical fertilizers can be made more effective. In China today, nodule bacteria fertilizer and "5406" antibiotic fertilizer are fairly widely used; the others are in the research and experimental use stages.

Root nodule bacteria are a polymorphic bacteria that live in symbiosis with compatible pulse crops and form root nodules that fix the nitrogen from the air supplying it to crops for their nutrition. The root nodule fertilizers used in China during the past several years have been principally peanuts, soybeans, and pulse green manures such as Chinese milk vetch, and Chinese trumpet creeper. Following inoculation with the compatible root nodule bacteria, peanut and soybeans average increases of from 10 to 28 percent, and output from Chinese milk vetch and Chinese trumpet creeper averages 30 to 40 percent increases.

(Zhang Xiaohua) [1728 1420 5478]

#### China's Seed Work System

The basic tasks in China's seed work is to make full use of varieties available, to accelerate the selection and breeding of new varieties and the promotion of new strains so that seeds will play a role in increased agricultural putputs and serve in bringing about the modernization of agriculture.

In China, scientific research and educational units, seed administration departments, variety assessment units, seed inspection units, seed companies, state stock (or superior) variety farms, and commune and brigade seed bases individually have responsibilities for crop seed breeding, assessment of varieties, seed production, processing and inspection, administration and management, and technical exchanges.

Seed companies are specialized state companies for the production, processing, and administration and management of seeds. The Chinese Seed Company was established on 15 July 1979, and by 1979, most provinces, prefectures, and counties had set up regional seed companies.

During the 30 years since the founding of the People's Republic, China's superior varieties breeding and promotion work has undergone several stages of development. During the period immediately following Liberation, because of our small-scale peasant economy with dispersed administration, only "family by family farming and household by household reserving of seeds" was possible. Since the formation of cooperatives and communes, a program of "four selfs and one supplement" in which the selection, retention, and use of seeds was carried out with production teams doing "self-selection, self-propagation, self-retention, self use, and supplemental distribution" has been instituted. By the 1970's a new situation developed with the emergence everywhere of a new form of operation larger than that of production teams whereby production brigade seed teams and commune superior variety farms uniformly propagated, cared for, and supplied their own production brigades and communes with seeds needed for production, and in which hybrid rice, corn, and gaoliang parent pairs were propagated by county superior variety farms, and commune superior variety farms made up hybrid varieties for uniform supply of seeds for use in the commune's fields. Following the smashing of the "gang of four," a "four -izations and unified supply" pilot program was begun whereby the seed task took another step forward toward modernization.

(Chong Ziju) [0112 1311 5468]

#### The Four -izations and Unified Supply" of Seeds

By "four -izations and unified supply" of seeds is meant specialization in the production of seeds, mechanization of processing of seeds, standardization of quality of seeds, and regionalization of the distribution of varieties of seeds with counties as the units responsible for organizing a unified supply of seeds. Specialization in the production of seeds means setting up of specialized seed production bases in accordance with crop needs for seeds for the propagation of seed stock and seeds to be used in fields in accordance with set technical operating rules. Mechanization of processing entails use of processing machinery for drying and selecting seeds, and for treating the seeds with chemical. Standardization of quality means that seeds to be supplied for production must undergo examination and meet quality standards established by the state. Regionalization of the distribution of varieties means the growing of crop varieties that accord with different cultural regions. Unified supply by the counties means that county seed companies will organize in a unified and systematic manner the propagation, processing and supply of seeds used in production.

The "four -izations and unified supply" of seeds marks a major reform in China's seed industry. It summarizes experiences in China's seed work, and makes use of the advantages of the industrialization of seeds internationally; it is an important measure in the modernization of China's agriculture.

In 1978, the China Seed Company set up pilot projects for the "four -izations and unified supply" in 12 counties in 9 province and municipalities including Zhengding County in Hebei Province, Qinggang County in Heilongjiang Province, and Wujin County

in Jiangsu Province. In 1979, these 12 pilot counties set up seed bases and sorted more than 64 million jin of seeds. After numerous production teams used the sorted seeds, they saved between 10 and 15 percent on the use of seeds as compared with previous years, and the rate of increase in output was about 10 percent. The 12 pilot counties have already begun to provide their own counties with superior varieties, and units using the seeds have universally won increases in output. As of the end of 1979, pilot counties throughout the country numbered more than 100.

(Chong Ziju) [0112 1311 5468]

#### Program for Plant Protection Work

In 1975, China's agricultural units summarized experiences of the Chinese people in their long fight against disease, insect, and weed damage to crops and put forward an unequivocal program for plant protection work of "comprehensive prevention and control with the emphasis on prevention." It required that plant protection work start with the agricultural ecological system as a whole and adapt general methods to local situations in the use of various measures including agriculture, chemistry, biology, and physics for comprehensive control of diseases, insect pests, and weeds. All measures were to be coordinated and complement each other. There could be an emphasis on certain measures at specific times in specific places, but there could be no mutual exclusion of measures for a single method of prevention and control. This program has begun to be conscientiously carried out in some places during the past 2 years. In 1979, a comprehensive prevention demonstration area of 110 million mu was underway in some major grain and cotton producing areas, and some advanced cases had occurred. For example, in 10 counties in the four prefectures (or cities) of Jingzhou, Xiaogan, Huanggang and Wuhan in Hubei Province, use of herbicides and pesticides decreased by 40 percent on the more than 2 million mu of demonstration area where comprehensive prevention was practiced, and chemical costs dropped 60 percent per mu. The number of colonies of natural enemies are gradually growing, reducing pollution by agricultural chemicals and improving the ecological environment.

(Zhi BaoJu) [6736 0202 5468]

#### Monitoring and Forecasting of Diseases and Insect Pests

China's farm crop disease and insect pest monitoring and forecasting endeavors began during the mid-1950's, and have grown rapidly during recent years. In 1978, the Ministry of Agriculture established a National Farm Crops Disease and Insect Pest Monitoring and Forecasting Station. By 1979, more than 1700 prefecture and county disease and insect pest monitoring and forecasting stations existed throughout the country. In that year changes were made in the methods of monitoring and forecasting on 23 major diseases and insect pests; monitoring and forecasting methods were formulated for the 11 diseases and insect pests that have become increasingly serious during the past several years; for every monitoring and reporting target, a two part system of systematic monitoring and forecasting and general monitoring and forecasting was set up, and new items were included in monitoring reports from different places for flying insect pests and for diseases that are prevalent over wide areas. Beginning in 1979, trend forecasts were issued to each province for 10 major diseases and insect pests including locusts, armyworms, paddy

rice borers, rice leafhoppers, corn borers, gaoliang aphids, cotton bollworms, wheat rust, cereal scab, and stunting disease to improve forecasting and initiative.

(Zhi Baoju) [6736 0202 5468]

#### Strengthening of Plant Quarantines

During the 1950's, China formulated quarantine regulations and set up plant quarantine organizations. By 1979, there were 36 port of entry animal and plant quarantine posts (or stations), and 22 inland plant quarantine stations for the quarantine of seeds, seedlings and products entering or leaving the country. In 1979, at the port plant and animal quarantine stations located in Guangzhou, Shanghai, and Dalian alone, 74 instances of foreign objects requiring quarantine were discovered. These included stinking smut of wheat, potato ringworms, *Zolium temelentum*, khapra beetles, grain weevils, red coconut weevils, and bean weevils against which China's agricultural production was protected. Additionally, more than 1400 inspections of exported agricultural products were made to assure the quality of our exports. In 1979, the Ministry of Agriculture also revived the Plant Quarantine Laboratory with responsibility for quarantine techniques and for research into methods of eradicating insects and extermiant bacteria on seeds and seedlings.

In accordance with a Sino-Korean plant quarantine agreement, in 1979 inspections for dangerous diseases and insect pests were conducted at the Sino-Korean border in Liaoning and Jilin provinces. It was found that the American white moth had penetrated into eight counties and cities in Liaoning Province. All authorities concerned are adopting control measures, have intensified quarantine, and are strictly guarding against its further spread.

As concerns internal quarantine work, in 1979 a general survey of dangerous diseases and insect pests was completed in the provinces (and autonomous regions) of Shandong, Shaanxi, Shanxi, Ningxi, Tianjin, Anhui, and Hubei. In some prefectures, improvements were made in quarantine organizations for implementation of quarantine measures, and disease and insect-free seedling propagation bases were set up for the control of the spread and infestation of certain diseases and insect pests. In She County in Hebei Province, for example, the glorious designation of "disease-free sweet potato protection area" was revived.

(Zhi Baoju) [6736 0202 5468]

#### Launching of Biological Prevention and Control

Research on biological prevention and control of crop diseases and insect pests began in China during the early 1950's, and has grown substantially during the past several years. In some places, *trichogramma* are in use for the control of sugarcane borers, corn borers, cotton bollworms, rice leaf rollers, and pine moths. *Chrysopid* flies are being used to control cotton bollworms, aphids, and rice fulgorid insects; use of *anastatus* sp. to control *tessaratoma papillosa* lichees; use of *beauveria bassiana* to control corn borers and pine moths; use of *bacillus thuringiensis* to control cotton bollworms and cabbage caterpillars; and use of jinggang antibiotic [0064 1481 7199 4790] against sheath and culm blight of rice. Further improvements are awaited in all of these.

By way of better developing and using China's resources in natural enemies, 26 provinces, municipalities, and autonomous regions began a survey of their resources in natural enemies of insect pests in 1979, learning that China has abundant natural enemy resources. For example, more than 80 different kinds of rice field spiders have been found in the two provinces of Anhui and Zhejiang, and 113 kinds were found in Hunan Province, greatly exceeding the number recorded abroad, and offering a huge potential for use in plant protection. Xiangyin County in Hunan Province has already launched comprehensive spider protection for insect control work from which very good results have been obtained. But use of natural enemies is also restricted by natural conditions, and use of pesticides also conflicts with their use; thus further understanding of patterns will be necessary to perfect this work.

(Zhi Baoju) [6736 0202 5468]

#### Agricultural Chemicals and Applicators

Following Liberation, production of pesticides and herbicides in China began from scratch and steadily developed. In 1979, 110 different kinds of agricultural chemicals were produced in China in a total of 537,000 tons, which with after-sale processing will make more than 1.52 million tons. In 1979, the quantity produced and marketed was the highest it had ever been since the founding of the People's Republic, and most was used for the prevention and control of major diseases and insect pests of grain and cotton.

Formerly agricultural chemicals were applied mostly with hand operated devices, but during the past several years, rapid development of motorized devices has taken place. During 1979, 76,000 motorized applicators were produced throughout the country, principal of which were the Dongfanghong Type 18, and the Gongnong Type 36. Tong County in Beijing, Zizhong County in Sichuan, Wuxi County in Jiangsu, and Wanquan County in Hebei have virtually mechanized the application of farm chemicals, and specialized, mechanized prevention teams have come into being. In the management and use of the motorized applicators, they have instituted a system of economic accounting to increase the utilization rates and the in-service rates of these devices.

(Zhi Baoju) [6736 0202 5468]

#### Elimination of Weeds in Fields

There are more than 500 kinds of weeds in China's fields. Those causing fairly serious damage to crops in wetland fields include more than ten varieties such as barnyard weeds and fescues; in dryland fields, there are more than 20 different varieties such as crab grasses and huicai [3500 5475], and of these varieties the damage done by wild oats is severe in the northwest and the northeast. In Qinghai Province alone, it occurs over an area of 4 million mu or 40 percent of that province's spring wheat area.

Beginning in the last 1950's, China began to use herbicides to eliminate weeds. During the past several years, steady expansion in their area of use has taken place in the provinces and municipalities of Heilongjiang, Jilin, Liaoning, Qinghai, Hubei, Hunan, Guangdong, Jiangsu, Shanghai, and Beijing. In 1979, the area treated with herbicides amounted to more than 60 million mu, a 50 percent increase over the

previous year. Nationwide, more than 20,000 tons of herbicides were marketed and sold, mostly 18 different kinds including 2,4 dichlorophenyl-4' nitrophenyl ether [NIP], trichlorosodium phenoxyde, and 2,4D butyl ester.

(Zhi Baoju) [6736 0202 5468]

**Major New Varieties of Crops Promoted in 1979\***

<u>Variety</u>	<u>Breeding Unit</u>
<u>Paddy Rice</u>	
Dalizao, No 1	Fujian Academy of Agriculture
Guangdabai	Fujian Academy of Agriculture
Hongnan	Guangxi Academy of Agriculture
Qingjiang Qishi Zao	Qingjiang County Institute of Agriculture, Jiangxi
Qingganhuang	Zhejiang Academy of Agriculture
Qinglian 16	Zhenjiang Prefecture Institute of Agriculture, Jiangsu
Zuxi 26	Zhenjiang Prefecture Institute of Agriculture, Jiangsu
Guangwen, No 5	Guizhou Academy of Agriculture
Qianyu 272	Guizhou Academy of Agriculture
Hwan, No 4	Hubei Academy of Agriculture
Hwan, No 5	Hubei Academy of Agriculture
Zhongdan, No 2	Zhoudong City Institute of Agriculture, Liaoning, and Crop Institute, Chinese Academy of Agriculture
Zhongzuo, No 9	Crop Institute, Chinese Academy of Agriculture
<u>Wheat</u>	
Xiaoyan, No 5	Plant Institute, Chinese Academy of Sciences
Xiyu, No 7	Northwest Institute of Water and Soil Conservation, Chinese Academy of Sciences
Beijing, No 18	Chinese Academy of Agriculture
Gaoxuan 56	Qinghai Plateau Institute of Biology
213	Central China Academy of Agriculture
Tannong, No 15	Yantai Prefecture Institute of Agriculture, Shandong
Ningmai, No 3	Jiangsu Academy of Agriculture
Ningmai, No 4	Jiangsu Academy of Agriculture
Heichun, No 2	Heihe Institute of Agriculture, Heilongjiang

\*The varieties presented in these data were recommended by pertinent provincial, municipal, and autonomous region varieties examining committees of experimental units.

### Barley

76-23

Shanghai Academy of Agriculture

### Corn

Danyu, No 9	Dandong City Institute of Agriculture, Liaoning
Longdan, No 2	Heilongjiang Academy of Agriculture
Suiyu, No 2	Suihua Prefecture Institute of Agriculture
Luyuandan, No 4	Shandong Institute of Agriculture
Ningdan, No 4	Ningxia Institute of Agriculture
Ningdan, No 6	Ningxia Institute of Agriculture
Chengai, No 2	Sichuan Institute of Agriculture

### Gaoliang

Hehong, No 7	Hejiang Institute of Agriculture, Heilongjiang
Longfuliang, No 1	Heilongjiang Academy of Agriculture
Jiza, No 52	Jilin Academy of Agriculture
Jiuza, No 1	Jilin Municipal Institute of Agriculture
Tieza, No 6	Tieling Prefecture Institute of Agriculture, Liaoning
Shenza, No 3	Shenyang Municipal Institute of Agriculture

### Millet

Xinnong 761	Xinxiang Prefecture Institute of Agriculture, Henan
Sigu, No 1	Siping Prefecture Institute of Agriculture, Jilin
Jigu 25	Hebei Academy of Agriculture
Jingu, No 9	Jinzhou Municipal Institute of Agriculture, Liaoning

### Potatoes

Kexin, No 7	Keshan Institute of Agriculture, Heilongjiang Academy of Agriculture
Liaoling, No 1	Liaoning Academy of Agriculture
Ningshu, No 1	Guyuan Prefecture Institute of Agriculture, Ningxia
Gaoyuan, No 8	Qinghai Academy of Agriculture
694-11	Tianchishan Institute of Agriculture, Enshi Prefecture, Hubei Province

### Cotton

Jimian, No 1	Xingtai Prefecture Institute of Agriculture, Hebei
Zhibao 86-1	Plant Protection Institute et al, Chinese Academy of Sciences
Shaan 5245	Shaanxi Cotton Institute
Luxiezuo, No 1	Kangzhuang Farm, Gaomi County, Shandong
Chongmian 249	Stock Cotton Varieties Farm, Chongming County, Shanghai
73-143	Nanyang Commune, Yancheng County, Jiangsu
Xinluzao, No 1	Xiayedi Experimental Station, Shihezi Region, Xinjiang
Xinhai, No 2	Turfan Region Institute of Agriculture
Junmian, No 1	34 Regiment, Bayinguoleng Zhou
Heishanmian, No 1	Stock Varieties Cotton Farm, Heishan County, Liaoning

### Soybeans

Mushi, No 6	Mudanjiang Teachers Training Institute
Nenfeng, No 9	Nenjiang Institute of Agriculture, Heilongjiang
Tiefeng 20	Tieling Prefecture Institute of Agriculture, Liaoning
Dandou, No 4	Dandong Municipal Institute of Agriculture
Qihuang, No 21	Shandong Academy of Agriculture

### Rape

Xiangnongyou, No 2	Hunan Academy of Agriculture
Shaanyou, No 3	Shaanxi Special Crops Research Institute
7211	Huayin Farm

### Peanuts

Yuexuan No 58	Shantou Prefecture Institute of Agriculture, Guangdong
Hua 28	Shandong Peanut Research Institute
Hua 37	Shandong Peanut Research Institute

**Major Superior Varieties of China's Major Crops\***

<u>Variety</u>	<u>Major Areas Promoted</u>	<u>Usual Yields Per Mu (Jin)</u>
<b>Paddy Rice</b>		
Guanglu'ai, No 4	Zhejiang, Hubei, Hunan, Jiangxi, Jiangsu, Anhui, and Shanghai	600 - 800
Zhenzhu'ai	Guangdong, Sichuan, Guangxi-Zhuang, Jiangxi Anhui, Guizhou, Hubei, Yunnan, Henan	700 - 800
Yuanfengzao	Jiangsu, Hunan, Zhejiang, Jiangxi, Shanghai, Hubei, Anhui	800
Xianfeng, No 1	Jiangxi, Hubei, Hunan, Anhui, Zhejiang	700 - 800
Erjiuqing	Anhui, Hubei, Jiangsu, Zhejiang, Hunan Jiangxi	700 - 800
Baoxuan, No 2	Guangdong, Guangxi-Zhuang	600 - 700
Xianggaizao, No 9	Hunan, Jiangxi	800 - 900
Nanjing, No 11	Sichuan, Jiangsu, Henan, Anhui	800
Guichao, No 2	Guangdong, Guangxi, Jiangxi, Sichuan	800 - 900
Lushuang 1011	Sichuan	800 - 900
Tuanjie, No 1	Guangxi - Zhuang	600 - 800
Hong 410	Fujian, Jiangxi	800
Guangxuan, No 3	Guangxi-Zhuang, Henan, Jiangxi, Yunnan, Guizhou, Anhui	600 - 700
Qingerai	Guangdong, Guangxi-Zhuang	700 - 800
Zhaiyeqing	Guangdong, Sichuan, Fujian, Guangxi-Zhuang	600 - 700
Huxuan, No 19	Anhui, Jiangsu, Hubei, Shanghai	700
Nonghu, No 6	Zhejiang, Jiangsu, Anhui, Hunan	600 - 750
Jigeng 60	Jilin	700 - 800

\*The varieties presented in these data were the major locally dominant varieties promoted in the major crop growing areas in 1979

Wheat

Taishan, No 1	Shandong, Hebei, Jiangsu, Shanxi, Anhui	1,000 (on fields with high amounts of fertilizer and water)
Fengchan, No 3	Anhui, Henan, Shaanxi, Hebei, Jiangsu	600 - 800
Boshou 7023	Henan, Jiangsu	600 - 700
Beijing, No 10	Hebei, Shanxi, Beijing, Tianjin	400 - 700
Fanliu	Sichuan	600 - 800
Dongfanghong, No 3	Hebei, Tianjin, Beijing	700 - 800
Nongda 139	Hebei, Beijing, Tianjin, Shanxi	500 - 700
Kezao, No 6	Heilongjiang	300 - 400
Jinmai 2148	Fujian, Guangdong, Qinghai	300 - 400
Ganmai, No 8	Gansu	400 - 700
Kefeng, No 1	Heilongjiang	300 - 400
Fengqiang, No 2	Jilin	300

Corn

Danyu, No 6	Shandong, Hebei, Shanxi, Liaoning, Beijing, Tianjin, Anhui	700 - 800
Zhengdan, No 2	Henan, Hebei, Shandong, Anhui, Beijing, Tianjin, Jiangsu	600 - 800
Qundan 105	Shanxi, Shandong, Anhui, Hebei, Hubei	700 - 800
Yunong 704	Hubei	600 - 800
Baidan, No 4	Shaanxi, Shanxi, Anhui, Guangxi-Zhuang, Sichuan	600 - 800
Jishuang 83	Jilin	800
Iu, No 39	Shandong, Anhui	800 - 900
Jidan 101	Jilin	800 - 1000

Zhengdan, No 2	Shandong, Beijing, Tianjin, Hebei, Shanxi, Jiangxu	800
Heiyu 46	Heilongjiang	600 - 1000
Wudan, No 1	Shaanxi	500 - 700

#### Gaoliang

Jinza, No 5	Shanxi, Hebei, Shaanxi, Gansu, Henan, Xinjiang	700 - 800
Jinza, No 4	Liaoning, Shanxi, Shaanxi, Gansu	800
Yuanza, No 10	Hebei, Beijing, Henan, Shandong, Tianjin Hubei, Anhui	700 - 800
Tongza, No 2	Heilongjiang, Nei Monggol	600 - 700
Xinza, No 52	Liaoning, Hebei, Shanxi, Shaanxi, Tianjin, Gansu, Nei Monggol	700 - 800
Boza, No 3	Shandong	700 - 800

#### Cotton

Xuzhou 1818	Hebei, Shandong, Shanxi	100 - 150
Dongting, No 1	Sichuan, Hunan	100 - 150
Hu 204	Shanghai, Jiangsu	150
Xuzhou 142	Jiangsu	150
Zhong 7	Shaanxi, Shanxi, Hebei, Hubei, Shandong	100 - 150
Daihongdai	Hunan	150
Nantongmian, No 5	Yancheng and Zhenjiang prefectures, Jiangsu	160
Emian, No 6	Hubei	150 - 200
Lumian, No 1	Shandong	120
Xiezuo, No 2	Zhejiang	150
Simian, No 1	Huaiyin and Dongtai, Jiangsu	100
Shaan 401	Wilt disease areas of the Yellow and Yangtze River basins	100

### Soybeans

Tieleng, No 18	Liaoning	200 - 300
Suidaohuang	Huainan area, Zhejiang, Fujian, Guangdong Guangxi-Zhuang	250
Fengshou, No 10	Heilongjiang	200 - 300
Fengshou, No 12	Heilongjiang	250 - 300
Jilin, No 3	Central and western Jilin Province	200 - 300
Junsong, No 9	Rather fertile areas along rivers in Jilin	300
Jilin, No 4	Central and southeastern Jilin and north- eastern Liaoning	200 - 300

### Coconuts

Yunnan 1000	Liaoning, Qinghai, Xinjiang, Shandong	200 - 250
Guizhou 67	Eastern Henan	200
Fangyou, No 3	Hunan	200
Guizhou	Guangdong, Guangxi, Fujian, Hunan, Jiangsu, Shandong	200
Jin'er Youai	Zhejiang	200
Minyou, No 5	Hubei	200
Shaanyou, 110	Shaanxi, Shandong	200

### Peanuts

Yunyou 551	Guangdong, Guangxi-Zhuang, Fujian, Hubei	300
Xuzhou 68-4	Shandong, Liaoning, Beijing, Tianjin	300
Ratsha 1016	Shandong, Liaoning, Beijing, Tianjin	300 - 400
Linhua, No 1	Linjin and Yantai areas of Shandong	400
Hua 11	Some areas around Yantai, Shandong	300 - 400

### Potatoes

Kexin, No 1	Heilongjiang, Jilin, Liaoning, Nei Monggol	3,000
Shanxi, No 15	Shaanxi, Nei Monggol	More than 2,000
Hutou	Hebei, Nei Monggol, Shanxi	2,000
Kexin, No 4	Heilongjiang, Jilin, Liaoning	3,000
Jinshu, No 2	Shanxi, Nei Monggol, Ningxia	3,000
Wensheng, No 4	Shaanxi, Sichuan, Hubei	2,000 - 3,000
Wuseng 601	Nei Monggol, Liaoning	2,000
Gao yuan, No 7	Qinghai, Shandong, Jiangsu	3,000
676-4	Hubei, Sichuan	2,000

### Sweet Potatoes

Yanzhu, No 3	Shandong	3,000 - 4,000
Yanshu, No 1	Shandong	4,000
Ningshu, No 1	Jiangsu, Henan, Hebei, Anhui	4,000
Ningshu, No 2	Jiangsu, Henan, Hebei, Anhui	4,000
Xushu 18	Jiangsu, Henan, Shandong, Sichuan	4,000

### Vegetables

Qingzaofeng Chinese cabbage	Heilongjiang, Jiangsu, Shandong, Henan, Jiangxi	12,000 - 15,000
Qingzazhongfeng Chinese cabbage	Shandong, Jiangsu, Shanghai, Hubei, Hunan, Jiangxi, Anhui, Liaoning, Hebei, Gansu, Zhejiang	10,000 - 17,000
Beijing, No 26 Chinese cabbage	Close-in suburbs of Beijing	22,000 - 25,000
Beijing 211	Beijing	23,000
Baochun cabbage	Beijing, Hebei, Tianjin, Shandong	6,000 - 7,000
Qingfeng cabbage	Beijing, Tianjin, Hebei, Shandong	15,000 - 18,000

## Forestry

On 13 February 1979, the Sixth Session of the Standing Committee of the Fifth National People's Congress approved in principle the "The Forestry Act of the People's Republic of China (for trial use)."

"The Forestry Act of the People's Republic of China (for trial use)" was China's first forestry law, and contained 7 chapters and 42 articles, the principal content of which follows:

**Chapter 1. General Regulations.** In accordance with China's circumstance of being a country with scant forests and in order to meet the needs of the four modernizations, practical experiences since the founding of the People's Republic have been summarized, and it is decreed that a program for building the forestry industry will "take the operation of forests as its foundation, developing the creation and care of forests simultaneously, with afforestation being greater than cutting in a combination of growth and use for multiple uses. In addition, in consideration of the different benefits to be derived from forests, all forests in the country will be classified into the following five categories, shelter forests, timber forests, economic forests, fuel forests, or special purpose forests, for purposes of administration of specific forests. This chapter also provides for guarantees that the right of ownership of forests by the state, the collective, and individuals shall not be transgressed, and that counties, communes and brigades in state designated forestry areas, forests will be paramount in a program of all-around development.

**Chapter 2. Forest Management.** This chapter stipulates that all echelons of the People's Government at the national and local levels should establish special forestry administrative organizations to be responsible for endeavors concerned with the building of the forestry industry. State forestry bureaus and state forest farms throughout the country are to institute management by echelons. Tree seed management for forestry production, surveys, planning, design, capital construction, production of lumber, and the chemical industry's use of forest products will be gradually transferred from administrative management to management by enterprises. In order to meet requirements for the long cycle, which characterized forestry production, it is stipulated that a forest cultivation fund will be levied on the selling price of lumber, bamboo, and other forest products for the establishment of a fund system to cultivate forests bases.

**Chapter 3. Forest Protection.** Explicit regulations have been made for the protection against and rescue from forest fires, for a halt to reckless cutting and denudation, for prevention and control of forest diseases and insect pests, and for protection of valuable animal and plant resources.

**Chapter 4. Afforestation.** This chapter stipulates, first of all, that the forest cover rate throughout the country shall be 30 percent, and it establishes forest cover rate standards for mountain areas, hilly areas, and plains areas. Next it gives regulations for afforestation by each jurisdiction and each unit. In the cutting of forests, it stipulates that renewal must be paramount, and requires that renewal must go hand in hand with cutting.

**Chapter 5. Cutting and use of forests.** This chapter stipulates that the State Forestry Bureau is the unit responsible for state-owned forests, and that counties are the units responsible for collectively-owned forests. Annual amount cut may not exceed the annual amount of growth. All felling of forests in the country must be part of the state plan, and cutting outside the state plan is strictly prohibited. Felling of trees in state-owned forests may be done by state forestry bureaus and state farms in accordance with plans handed down by the state. Collectively owned forests may be felled under the guidance of the state plan and according to contracts signed by the unit owning the forest and forestry departments. It stipulates that the transportation of all lumber and bamboo or lumber and bamboo manufactures requires issuance of a transportation certificate by forestry departments without which communications and transportation units may not undertake such transport.

**Chapter 6. Awards and Penalties.** This chapter stipulates rewards for those who have rendered meritorious service in the creation, cultivation and protection of forests and in forestry research. For those who violate forestry law causing damage to forestry resources, it provides for administrative punishment, economic penalties, or even investigation and affixing of responsibility for the crime, according to the seriousness of the offense.

(Xu Daoqi [1776 6670 0796])

#### **State Council Issuance of Notice on Protection of Forests**

Because of the incitement to anarchy by Lin Biao and the "gang of four" during the Cultural Revolution, and the trampling of the socialist forestry law, China's forestry resources suffered serious damage. In order to put an end to the disorder and return matters to normal in the protection of national forest resources, on 15 January 1979 the State Council issued its "Notice on Protecting Forests and Prohibiting Indiscriminate Cutting and Denudation." It contained a total of 10 articles, most important of which are the following: (1) Resolute maintenance of state and collective ownership of forests. Conscientious inventory of state-owned forests that have been invaded and occupied with resolution of conflicts regarding rights to mountain forests. (2) Strict prohibition against indiscriminate cutting and denudation, and disallowance of the exchange of timber for other goods through illegal cooperation. Felling of timber must be considered and approved, with production according to plan. (3) Strict prohibition against the destruction of forests to clear land for agriculture, or the destruction of forests to engage in sideline occupations. Poaching or felling of state designated valuable animals or plants is not allowed. (4) Strict prohibition against illegal selling and transporting of timber and the dealing of resolute blows against speculation and profiteering. (5) Building of an organization and a system for protecting forests and preventing forest fires, restructuring public security in forest area societies to keep tabs on the unauthorized inflow of personnel for strict prevention of outbreaks of forest fires. (6) Vigorous advocacy of afforestation in a policy of ownership to the planters. (7) Adherence to sensible felling, with prompt renewal of cut over areas to correct the erroneous practice of emphasizing felling but slighting afforestation. (8) Strict and impartial meting out of awards and punishments, commending and rewarding those who perform meritorious acts and punishing those who damage the forests. The "Notice" also called upon every jurisdiction to integrate actual local circumstances, conduct a one-time all-around examination

of the protection and management of forests, earnestly carry out the provisions of the notice for the protection of forests, strictly and impartially enforce laws and discipline, carry out policies, protect the forests, and develop forestry production.

(Zhang Lishen [1728 4539 6500])

### China's Forest Resources

Historically China has not exercised control over its forests, so the extent of its forest resources is not clear. Since the founding of the People's Republic, vigorous examination of the forests has been made under the leadership of the party and the government. Between 1974 and 1976, a comprehensive check of forest resources was made, and during the past 2 years a continuous system for checking forest resources has been set up with responsibility going to provinces, municipalities, and autonomous regions. These measures have laid a foundation for the timely survey of the current inventoring situations from now on and for mastery over the growth and decline of resources.

As a result of limitations imposed by natural conditions and the historically unbalanced development of society, existing forests in China are scarce and their distribution is uneven. China's existing forest area amounts to 1.83 billion mu (not including bushes or sparse forests with a canopy density under 0.3), or 12.7 percent of the country's land area, for an average of less than 2 mu per capita. Among 160 nations and regions of the world, China's forest cover rate and its per capita forest area rank in the 120th position and the 121st position respectively. Five standing tree reserves amount to 9.5 billion cubic meters for an average of 9-odd cubic meters per person. According to incomplete statistics from 75 countries, China's reserves occupy 57th position. In existing forests, tea-oil trees, tung oil trees, Chinese chestnut trees, and walnut trees are scarce, covering only 1.28 million mu or an average .01 mu per person. There are 40 million mu of tea-oil trees and 6.65 million mu of tung oil trees. In terms of forest distribution, remote northeastern and southwestern forest areas hold one-half the nation's forests and three-fourths of its reserves. Densely populated and industrially developed North China and the central plains area have a forest area of only 190 million mu for an 11 percent cover rate and an average of less than 0.6 mu per capita. Reserves are only 350 million cubic meters for an average of 1 cubic meter per capita. In the five provinces and autonomous regions of Gansu, Ningxia, Qinghai, Xinjiang, and Nei Monggol (excluding the three eastern leagues), which occupy 37 percent of China's land area, the forested area is only 58,950,000 mu, and the forest cover rate is 1.1 percent, amounting to only 3.2 percent of the forested area of the country.

The varieties of forest trees and animals in China are richly varied. There are more than 5000 kinds of woody plants of which more than 2000 varieties are shrubs and common bushes. There are 13 families of gymnosperms in the world in more than 7000 varieties, and China has 12 families (two families of which were introduced from elsewhere) in more than 300 varieties. Examples which are peculiar to China include such species (or genera) as the silver spruce [*Cathaya argophylla*] gingko, *Metasequoia*, golden larch, China fir, and *Pseudotaxus chienii*. Cover vegetation which are peculiar to China includes the dove tree, *Camptotheca acuminata*, *Tsoungiodendron*, *Tetracentron sinense*, *Emanopterys henryi*, and Chinese tulip tree (which is possessed by only China and the United States among all the nations).

in the world, each with one species). Other trees such as tropical and semi-tropical sijing [1311 0079], *Nomalium hainanensis* rosewood, xuanmu [2775 2605], ferrous mesua, Chittagong Chickrassy, and representative trees from the south Asian tropical rain forest such as longnǎo xiāngliáo polei [7893 5207 7449 2436 0980 1093], green plum, wangtian tree [2598 1131 2885], and Tongkin camphor, which are also rare tree species, species that are valuable for their wood, economic tree species, or species valuable for scientific research.

China's forest animals are also abundant. According to incomplete statistics, it has more than 2100 different types of fauna, amounting to 10 percent of the world total including 1,167 species of birds, 428 species of beasts, 299 species of reptiles, and 208 species of amphibians. Two-thirds of these animals are forest creatures including, giant pandas, golden monkeys, gibbons, takins, white lip deer, northeastern tigers, elephants, hema birds [5464 7456 7680], hornbills, peacocks, and red-crowned cranes, all of which are either peculiar to China or valuable and rare creatures.

(Lin Zi [2561 6327])

#### Mass Afforestation Campaign

Since liberation, China has depended largely on communes and brigades for collective afforestation and for active development of state afforestation. It has also encouraged the policy of commune members and individuals in tree planting, and has launched mass afforestation campaigns. The nationwide accumulated afforested area amounts to 420 million mu, 70 percent of which is collectively owned. More than 10 billion trees have been planted in the "four besides" (beside villages, beside roads, beside bodies of water, and beside dwellings).

On 23 February 1979, the Standing Committee of the National People's Congress approved in principle "The Forestry Act of the People's Republic of China (for trial use)", and designated 12 March of each year as national arbor day for the mobilization of people nationally for active participation in an afforestation campaign in order to foster a new custom of teaching everyone to plant trees and cherish forests. On 1 March, the Ministry of Forestry and the Central Committee of the Communist Youth League convened a National Youth Afforestation Conference at Yanan to mobilize millions upon millions of youths in a campaign to make the country green by planting trees, flowers and grass. Such departments and units as railway, urban construction, and coal also formulated and revised afforestation plans, setting forth some afforestation policies and regulations, and accelerating the pace of national greening. Each province, municipality, and autonomous region also made specific assignments of personnel, organizing the mobilization of personnel in every industry and trade to launch an afforestation campaign. In many places, leaders took the lead for common action by state-run [enterprises], the collectives, and individuals to complete or overfulfill afforestation plans. Nationally, 3,900 state forest farms and 220,000 commune and brigade-run forest farms also played a great role in the building, growing, and the protection of forests. The principal area for the building of the "three norths" [Northwest, North and Northeast] shelter forests organized 8,100 people to join a special corps to actively begin shelter forest reconnaissance and designing work.

In 1979, as part of the building of the "three norths" shelter forest, and the greening of the "four besides" on plains, the country established fast growing timber and oil-bearing tree forest bases as the focus of a mass campaign of afforestation, vigorously moved ahead, and made considerable accomplishments. According to preliminary statistics, more than 60 million mu were afforested throughout the country, of which the collectively afforested area was about 50 million mu. A 10 million mu area in 324 counties (or banners) in 11 provinces (autonomous regions) was afforested for the "three norths" shelter forest. In North China and on the central plain in 11 provinces, municipalities and autonomous regions, more than 400 counties (or municipalities), which were mostly on the plains, planted 400 million trees as part of the "four besides." This included the planting of a forest network on 30 million mu of farmland. Quick growing trees were planted on 10 million mu, and economic forests were planted on 13 million mu throughout the country. The plantings of economic forests included more than 7 million mu devoted to oil-bearing trees such as tea oil and tung oil trees. Numerous communes and brigades which had launched a mass afforestation campaign early are now self-sufficient in lumber and firewood or have a surplus as their forests flourish and their grain produces bumper harvests. Advanced forestry communes and brigades (or forest farms) receiving State Council commendations in 1979 included 24 units in Yanting County's Linshan Commune, and Pingba County's Fenghuang Commune. Seven people earned the designation of national labor model.

(Lin Zao [2651 6644])

#### Beginning Construction of "Three Norths" Shelter Forest System

Northwest China, North China, and the western part of northeastern China (abbreviated as the "three norths") sustain serious disasters from drought, sand storms, frosts and freezes, alkalinity and salinity, and soil erosion. In 1952, construction began on a shelter forest traversing the western part of the northeast and the eastern part of Nei Monggol, and on a sandbreak forest in the northwest. Additionally afforestation and grass planting work for water and soil conservation was begun in the loess plateau. Following the smashing of the "gang of four," the State Forestry Bureau put forward a preliminary draft plan for the "three norths" shelter forest system, and in May 1978, a meeting of forestry bureau directors from provinces (or autonomous regions) concerned met in Xian for discussions and revisions to the plan. In November of the same year, it was included by the State Council as a key item of construction in the state plan. Designated as part of the "three norths" shelter forest system were Xinjiang, Qinghai, Ningxia, Gansu, Shaanxi, Nei Monggol, Shanxi, Hebei, Liaoning, Jilin, and Heilongjiang, a total of 11 provinces (or autonomous regions) and 324 counties (municipalities and banners) covering a land area of 3.9 billion mu. The first phase of the project was the building of 80 million mu of shelter forest, including farmland shelter forests, shelter forests for basic pasturelands, forest belts to stabilize sands, forest tracts to stabilize sands, water and soil conservation forests, and economic forests. This required initial construction of a shelter forest system linking networks, tracts and belts using shrubs, bushes, and grasses in combination to ward off drought and wind-driven sand to conserve water and soil.

The year 1979 marked the beginning of construction of the "three norths" shelter forest system. Eleven provinces (or autonomous regions) convened one after another specialized meetings, revived and strengthened forestry organizations on all echelons, and organized specialized teams of more than 8,100 people for the initial completion of provincial (or autonomous regional) shelter forest plans and design programs. In 1979, an area of 11.96 million mu was afforested in the "three norths" area overfulfilling the plan by 4.4 percent. The quality of afforestation was also better than what it had been in the past. Each province (autonomous region) also intensified the work of growing seedlings. Statistics show that 5.8 million jin of seeds of various species of forest trees were collected for the "three norths" area, and seed collecting bases were initially set up in 90 places. There were 60 superior variety propagation farms that propagated 1.47 million mu of seedlings, enough to grow 8.3 billion trees.

At the initiative of the China Science and Technology Association, the Chinese Forestry Society organized scientists for a deepgoing examination of the drought and windblown sand areas of the loess plateau. It also convened an academic discussion meeting on the building of the "three norths" shelter forest system in Beijing, which made constructive suggestions on the overall plan, for the protection of existing plant cover, and for water-resources-control forests.

By way of bolstering the leadership, the State Council set up a leading small group for the "three norths" shelter forest system construction, and set up a "Three Norths" Shelter Forest Construction Bureau at Yinchuan City, which is on the front line of the project. The Ministry of Forestry also operated various kinds of training classes, training 822 leadership cadres and key technical cadres.

(Guan Junwei [7070 0689 5588] and  
Li Yigong [2621 0001 0501])

#### China's Nature Preserves

Preservation of nature and of natural resources is an important matter bearing on the future of the country and its people and on succeeding generations. Nature preserves are major bases for the protection of the country's natural environment and natural resources, and particularly for saving and preserving biological species that are on the verge of extinction. This plays an important role in the development of production, culture, hygiene, and tourism, and in bringing about the four modernizations. Since the Third Session of the First National People's Congress in 1956 first put forward a proposal for the establishment of nature preserves up until the end of 1979, 55 nature preserves have been established throughout the country in 19 provinces (or autonomous regions) covering an area of more than 1.6 million hectares, or 0.17 percent of the national land area. The major natural preserves are Wolong in Sichuan, Baishui Jiang in Gansu, Foping in Shaanxi, Wuyishan in Fujian, Huaping in Guangxi, and Changbaishan in Jilin, which have been made parts of the key national nature preserves. The three natural preserves of Wolong, Changbaishan and Guangxi Province's Dinghushan have become international research bases, and in 1979 formed part of the world human and biosphere protected area network.

### Changbaishan Nature Preserve

Founded in 1960, it has an area of 210,000 hectares. It is located on the border of the three counties of Changbai, Fusong, and Antu in Jilin Province, and abuts the territory of Korea to the southeast. This preserve is a composite natural preserve representative of China's temperate zone forest ecological system. Within the preserve, the topography is complex, resources abundant, the scenery beautiful, and the natural ecological system fairly complete. Owing to differences in topography and climate, there are four distinct, vertical natural landscape belts. Plants number more than 1300 species of which rare trees of high economic value include Korean pine, Changbai pine, Changbai larch, northeast China ash, and huang bolo [7806 5474 5700]. In addition, there are upwards of 100 valuable medicinal species including ginseng, dangshen (*Codonopsis pilosula*), and *Gastrodia elata*. There are more than 300 species of terrestrial vertebrates including 50 species of animals, more than 200 species of birds, numerous amphibians and reptiles, plus numerous varieties of fish and more than 1000 species of insects. Listed as rare animals for state protection are more than 10 species of northeast tigers, sika, sable, lynx, and leopards. Fixed observation stations are in the process of being built in these preserves, and international style scientific research is being undertaken on "the structure and function of the ecological system of the Changbaishan forest and its biological productivity."

### Dinghushan Natural Preserve

Established in 1956, it has an area of 1,200 hectares. Located in Gaoyao County, Guangdong Province, 15 kilometers from Zhaoqing City. This preserve is located near the Tropic of Cancer and has a semi-tropical climate, which is warm and humid with copious rainfall, has numerous varieties of vegetative cover, and abundant biological resources. It is a treasure house of biological resources for south China. It has more than 2000 species of higher plants belonging to 278 families and 1,118 genera. It contains *tsoongiodendron* trees, which are peculiar to China, and state category 1 protected tree varieties, *Erythrophyloem Fondii* wild lichee. Plant species specimens found and named here include about 40 species including Dinghu *lindera*, Dinghu azaleas, and shiny leaf ormosia. Resource plants include economic forest trees in more than 300 species, plants used in medicines in more than 900 species, more than 100 varieties of oil-bearing and fiber plants, more than 40 species of starchy plants, more than 60 species of plants used in tanning, and almost 30 varieties of wild fruits. Within the preserve is a 270 hectare natural forest that is more than 400 years old, which is representative of world semi-tropical monsoon evergreen and broadleaf forests. In its component types, community structure, growth, and succession, as well as in its biological resources and natural conditions, it has its own characteristics and laws reflecting the interrelationship between zonal vegetation cover and environment. During the past 20 years this has become a fine base for scientific research and practical education in China. In 1978, the Chinese Academy of Sciences designated this preserve as one of 10 permanent research stations on the forest ecological system. In 1979, it was designated a permanent research station in the international forest ecology system.

### Wolong Natural Preserve

Founded in 1963, it was expanded in 1975 from 20,000 hectares to 200,000 hectares, and designated a major state natural preserve. It is located in the southwestern part of Wenchuan County in Sichuan Province, on the eastern slope of the Qionglai Mountains, in the transitional area between the Qinghai-Tibetan Plateau and the Sichuan Basin. The topography is that of high mountains and gorges, and the elevation above sea level is just under 4000-odd meters. The climate there is warm and cold, and with much precipitation and humidity. Vegetation cover from low to high elevations may be divided into evergreen, deciduous broadleaf forests; mixed coniferous and broadleaf forests, coniferous forests, grassy marshland watered by the high Asian mountains in fairly complete perpendicular bands. Here are preserved most abundant animal and plant resources. It is a comprehensive natural preserve for the protection of rare animal resources such as giant pandas, and is representative of the forest ecological system of the southwestern mountain forest system. A preliminary survey shows this area contains more than 300 bird species and more than 60 animal species including 29 world famous rare animals peculiar to China such as giant pandas, golden monkeys, niuling [3662 5024], white lip deer and lessers pandas, snow leopards, red deer, shuilu [3055 7773] monals, and tragopans which are animals protected by the state. There are several thousand species of wild plants such as the valuable Sichuan Chinese larch, *Picea brachytyla*, Chinese yew [4767 6258 2619], and the ancient and rare *Dipteronea* [6855 6929 286B], and lianxiang tree [5571 7449 2885]. There are also famous Chinese medicines such as *Fritillaria thunbergii*, *Gastrodia elata*, *Astragalus membranaceus*, Chinese angelica, and *Codonopsis pilosula*. The preserve is now planning to build China's first giant panda domestication and propagation center, and it is undertaking international scientific experiments on the "structure and function of forest ecological systems and the movements of pandas and other valuable animal groups."

### Wuyishan Natural Preserve

This was designated a major national nature preserve in 1979. It has an area of more than 56,600 hectares. It is located in the area of the dominant peak of the Wuyi Mountain system at the point of intersection of Jianyang, Chongan, and Anze counties in Fujian Province. On the north it abuts Jiangxi Province. Topography within the region is complex with numerous towering mountain peaks. There are more than 101 mountain peaks at an elevation of more than 1,500 meters above sea level, and the principal mountain peak, Huanggangshan is at an elevation of 2,158 meters above sea leve. This is the tallest peak along the east China seacoast. The climate is warm and humid, and rainfall copious. This region holds the most complete tract of primeval forest along the southeastern coast of China. Its natural resources are abundant, and it is an all-around natural preserve that is representative of the semi-tropical region of eastern China. It has various kinds of plants, more than 2000 species of them among which many are rare tree species and famous medicinal plants such as Chinese hemlock [*Tsuga chinensis*], bright leaf beech, Chinese torreya [*Torreya grandis*], gingko, Chinese littleleaf box, and Chinese cassia. Varieties of wild animals are also numerous, among them are rare animals designated for protection by the state such as the Fujian tiger, the Yunpao [0061 6283], Rhesus monkeys, short tail monkeys [4252 3029 3729], water deer [shui lui 3055 7773], zibets, civets, yellow abdomen tragopans, and silver pheasants. This is a famous scenic spot known both in China and abroad and with a hundred year history in the collection of biological specimens. Incomplete statistics show that specimens taken here by Chinese and foreigners alike and given names include 16

species of mammals, 40 species of birds, 21 species of reptiles, 6 species of amphibians, more than 580 species of insects, and numerous species of fish. Fujian Province has 77 species of snakes, 54 of which or more than 70 percent are located here. In reptilean areas, the density of lizards is 25 per square meter. For this reason, this place has been honored by international authorities with the designation "key to the study of Asian amphibians and reptiles." China has 32 orders of insects, of which 31 orders may be seen here in what might be termed "a world of insects."

(Qing Jianhua [0615 1696 5478] and  
Huang Zhulan [7806 4376 5695])

#### Prevention and Control of Forest Diseases and Insect Pests

China has numerous varieties of forest diseases and insect pests, more than 100 of them appearing frequently and in large numbers. Forest diseases and insect pests cause a great deal of damage to forestry production. In 1979, damage to timber caused by the pine moth alone amounted to more than 3 million cubic meters.

Prevention and control of forest diseases and insect pests was a task begun only following Liberation in China. During the 1950's, this work was done mostly by hand; during the 1960's it was done mostly with chemicals; and in the 1970's, a gradual development of chemical prevention and control in conjunction with biological prevention and control took place. In 1979, the area of prevention and control of forest diseases and insect pests covered 38 million mu, a 190 fold increase over the period immediately following Liberation.

In 1979, prevention and control work against forest diseases and insect pests consisted principally of the following: (1) Continued chemical prevention and control. In 1979, the area treated chemically amounted to about 60 percent of the prevention and control area. In 19 provinces, municipalities, and autonomous regions, aircraft were used to spray chemicals. Techniques using both ground and aircraft with ultra low volume sprayers for applying chemicals for the prevention and control of forest insect pests continue to be popularized everywhere. (2) Increased effectiveness of biological control of insects. In 1979, numerous areas used large quantities of Beauveria and trichogramma to control forest insect pests over an area of more than 10 million mu. The Dongzhai Forest Farm in Loshan County, Henan Province continued into 1979 an earlier practice of hanging out more than 1,500 man-made birds nests to attract insect-eating bird varieties to protect more than 10,000 mu of pine forests against infestation by pine moths. Everywhere quite effective results were obtained in the use of bacteria, viruses, ladybugs, and Chrysopa perla to control insect pests. (3) Revival of monitoring and forecasting organization and system. In 1979, 10 provinces (and autonomous regions) revived and set up forest disease and insect pest monitoring and reporting stations, or sites staffed with monitoring and reporting personnel. Throughout Fujian Province, 73 forest disease and insect pest monitoring and reporting sites were set up, and personnel were given training to give impetus to the monitoring and forecasting work. (4) Launching of pilot projects in forest quarantine. Formerly, Taian and Faku counties in Liaoning and Huanan County in Heilongjiang were able to control the outbreak of dangerous diseases and insect pests in poplar trees through the adoption of quarantine measures. In June 1979, the Ministry of Forestry convened in Liaoning an on-site conference for poplar tree

quarantine and disease and insect prevention and control in northern regions, which required each northern province (or autonomous region) to begin poplar tree quarantine, and each southern province (or autonomous region) to also select one or two tree varieties for a pilot project to get forest quarantine work gradually underway. (5) Survey of forest diseases and insect pests. As of 1979, 9 provinces (or autonomous regions) had begun surveys, and the other provinces (and autonomous regions) will launch them in 1980. They will be completed in 1981.

(Chiu Shousi [6726 1343 1835] and  
Liu Kemin [0491 0344 2404])

#### Forest Area "Aerial Firefighting"

The Daxing-Anling forest area is China's major timber producing area. In that area, the population is sparse, and movement difficult. When a forest fire breaks out, it is frequently impossible to discover it at once and put it out, with the result that great damage is done to forest resources. Formerly the area destroyed by forest fires yearly amounted to half the forest area of Heilongjiang Province, or one-fourth the forest area destroyed by fire throughout the country.

In 1979, this area instituted use of helicopters to lift forest rangers to fight forest fires, achieving good success with them. In April 1979, a fierce fire fanned by high winds at the Wodu He in Heihe Prefecture was able to jump the Nen Jiang and threatened the primeval forest in Daxing-Anling. The former method of mobilizing people from hither and yon to fight the fire frequently meant delays that led to serious losses. On this occasion, however, helicopters were used to airlift 230 forest fire fighters to the scene of the fire where, after a day and a night of efforts, the fire that had jumped the Nen Jiang was entirely extinguished. Airlifts were used on 45 occasions or in 50 percent of all fires during 1979 to put out fires in the Daxing-Anling forest area, thereby reducing the number of large fires and exceptionally large fires to bring about a striking decline over 1978 in damage from forest fires.

(Guang Chengxiang [6782 0701 4382])

#### Citations for Advanced Units that Protect Forests and Prevent Fire

A great amount of work has been done everywhere in China since the founding of the People's Republic on forest protection and fire prevention. Particularly following the smashing of the "gang of four," some places have strengthened leadership, have revived or formulated protection measures, have improved organization, have strictly carried out rules and regulations, have conducted widespread and thorough-going propaganda and indoctrination of the masses, have set up special units and have launched the work of preventing and extinguishing fires using the masses combined with specialists to protect the forests. At the same time, they have bolstered the building of fire prevention facilities so that fires can be promptly discovered and extinguished in order to effectively prevent forest fire disasters and reduce losses. As a result quite a few counties, state-forestry bureaus, and forest protection and fire prevention advanced units have not had forest fire disasters for several years, even 10, 20 or more years. In August 1979, the Ministry of Forestry decorated 65 forest protection and fire prevention advanced prefectures (or zhous), counties (or banners), state-forestry bureaus, and forest

protection and fire prevention advanced units, including the Aba Tibetan Nationality Autonomous Zhou in Sichuan Province, the Hami Forest Region in the Uighur Autonomous Region in Xinjiang Province, the Dafeng Forestry Bureau of Boli County in Heilongjiang County, Bazhong County and Dege County in Sichuan Province, Guangning County in Guangdong Province, Jianning County in Fujian County, Fukang County in the Uighur Autonomous Region of Xinjiang Province, Huanglong County in Shaanxi Province, Rong County in the Guangxi-Zhuang Autonomous Region, Wengan County in Guizhou Province, and Jianghua Yao Nationality Autonomous County in Hunan Province.

(Guang Chengxiang [6782 0701 4382])

#### New Development of Raw Lacquer Production

China has a several thousand year history of growing lacquer trees and using lacquer. Formerly, however, reliance was placed on trees growing in the wilds where resources were scattered, forcing a catch-as-catch-can existence. Production methods were antiquated, and the rate of production very low. Since the founding of the new China, raw lacquer production has seen new development; resources have expanded remarkably, and raw lacquer output has steadily risen.

During the past several years, the state has called for the planting of large numbers of lacquer trees in accordance with local conditions, transforming wild growth into the domesticated planting of trees, and transforming dispersed growth into centralized plantings. A program of dual development of old and new areas, and equal importance to large and small lacquer trees has been instituted, giving an entirely new look to production. A group of lacquer trees from which lacquer may be tapped within five years after planting has emerged, and some trees are tapped year after year for the annual production of an average 50 jin per mu of lacquer. By the end of 1979, lacquer tree resources throughout the country had been expanded to 500 million trees, a twofold increase over the period immediately following Liberation. Lacquer output was more than 56,000 dan, a 2.8 fold increase over the period immediately following Liberation. The number of counties from which more than 1,000 dan of lacquer is purchased annually by the state increased from 8 in 1978 to 13 [in 1979]. In Langao County in Shaanxi Province, which has the highest annual output, output reached more than 2,300 dan. Additionally, scientific research in the breeding of superior varieties of raw lacquer trees, use of hormones to stimulate increased output by the lacquer trees, improvements in the configuration of slashes made in the lacquer trees, and prevention and control of allergic reactions to raw lacquer have made outstanding progress.

In April 1979, the Ministry of Forestry and the main offices of marketing and supply cooperatives throughout the country held a joint national conference on lacquer production and procurement work in Hubei Province in which they summarized and exchanged experiences, and decided to establish 86 lacquer production base counties in 12 provinces and autonomous regions throughout the country to give attention to scientific afforestation, the growing of trees, and popularization of scientific tapping. It is anticipated that great strides will be made during the 1980's in the output of lacquer.

(Gu Longjun [7357 7893 0193])

## Introduction of Olive Trees

Olive trees are an ancient variety of tree famed throughout the world as a source of olive oil, which originally grew in countries around the Mediterranean Sea. In 1964, China began the importation of 10,000 trees for cultivation at 12 sites in 8 southern provinces (and autonomous regions). By 1972, the number had increased to almost 10 million trees at several thousand planting sites in 15 provinces, municipalities, and autonomous regions. The survival rate for the cutting of tender twigs from the olive trees has gradually increased to better than 85 percent, achieving advanced foreign levels. Over the years, China has brought in more than 120 olive tree varieties from eight countries. In 1979, with the help of the United Nations Food and Agriculture Organization, 26,000 scions of 58 different varieties were brought in from Italy, Spain, and France and grafted to stock in breeding farms in Shaanxi, Hubei, Sichuan, and Yunnan provinces. The survival rate was 70 percent, and every variety has been preserved. Following a long period of selective breeding at sites for introduced variety in various provinces (and autonomous regions), a group of superior varieties or types suited to local areas has been selected, and a group of breeding nurseries and scion selection nurseries have been set up to create favorable conditions for China's development of olive tree cultivation.

In 1979, China's olive oil output was more than 70,000 jin; this was the highest annual output since the introduction of olive trees. At the Chenggu County Citrus nursery in Shaanxi Province where 70 olive trees have been growing for from 10 to 15 years on 2.07 mu of land, from 1973 to 1979 average yields of 770 jin per mu of olives were produced, which yielded 154 jin of oil. In 1978, olive yields averaged 1720 jin per mu and yielded 344 jin of oil. In 1979, a 1.5 mu experimental grove at the Hubei Provincial Forest Institute had average yields of 555 jin of olives per mu, which yielded 110 jin of olive oil. In 1964 at the Yunnan Provincial Forest Institute, maximum olive output from a single tree was 287 jin. These examples of high output have reached the levels of the major olive producing countries, Italy, and Spain.

(Li Juzhen [2621 5112 2823])

## Timber Processing and Forest Products Chemical Industry

During the period immediately following Liberation, the major products of timber processing and the forest products chemical industry were sawn lumber, plywood, rosin, and tannin extract, for all of which output was slight. In 1951, national output of sawn lumber was 3,375,000 cubic meters, of plywood 17,000 cubic meters, of rosin 23,000 tons, and of tannin extract 4 tons. In 1958, following the beginning of development of forest resources for multiple uses, new products included fiber board, shaving board, and shellac. Output from timber processing and the forest products chemical industry increased gradually over the years. As a result of the disturbances and destruction caused by Lin Biao and the "gang of four" during the Great Cultural Revolution, the speed of development slowed. But following the smashing of the "gang of four," the speed of development of timber processing and the forest products chemical industry again increased. In 1979 national output of sawn lumber was 12.71 million cubic meters, of plywood 292,000 cubic meters, of fiberboard 441,000 cubic meters, of shaving board 52,800 cubic meters, of rosin 298,000 tons, of tannin extract 33,000 tons, and of shellac 2,121 tons.

(Li Jiahu [2621 4949 2579])

## Livestock and Sideline Occupations

### New Developments in Livestock Production

Great development has occurred in China's livestock industry during the past 30 years. Between 1949 and 1978, the number of large domestic animals has increased from 60.02 million head to 93.89 million head; sheep and goats increased from 42.34 million head to 169.94 million head; and hogs increased from 57.75 million head to 301.29 million head. Output value of the livestock industry has risen from 3.4 billion yuan to 19.3 billion yuan. In 1979, China's livestock industry entered another new period of development from which heartening results were obtained. The number of live hogs, sheep, goats, and large domestic animals as well as all categories of livestock products showed a general increase over 1978. Statistics show an 18.42 million head increase in the number of live hogs in inventory for a 6.1 percent increase, a 26.58 million head increase in the number of hogs sent to slaughter for a 16.5 percent increase, and a 13,205,000 head increase in the number of sheep and goats in inventory representing a 7.8 percent increase. Reversing a situation of yearly declines during the past several years the number of large domestic animals has begun to rise, with an increase of 700,000 head for the year. Varying degrees of expansion also occurred for chickens, ducks, and geese. As a result of the substantial development of livestock production, the quantity of state procurement for all categories of livestock products showed a tremendous increase, and the market supply situation greatly improved. The state purchased an additional 21 million-plus fattened hogs, and the weight per hog also increased by 12.1 jin. Purchases of beef cattle amounted to 1.64 million head, a 20 percent increase over the previous year. Purchases of carcass-type sheep amounted to 11.29 million head, a 17.8 percent increase over the previous year. Purchases of fresh eggs amounted to 1.67 billion jin, a 49.8 percent increase over the previous year. Quantity of sheep's wool purchased amounted to 150,000 tons, an 11 percent increase over the previous year.

Main reasons for the rapid development of the livestock industry during 1979 were the following. Nationwide rural village and livestock area implementation of a series of policies giving continued encouragement to commune members to raise pigs, cows, sheep, and goats and the active collective raising of pigs, cows, goats and sheep as stipulated in two CCP Central Committee documents on the development of agriculture. The state also increased its purchase prices for major livestock products such as fat hogs, beef cattle, carcass-type sheep, and fresh eggs. Additionally, a bumper harvest in agriculture, which provided substantial feed to the livestock industry, was also a major reason that the livestock industry was able to develop so rapidly.

The national livestock area grasslands building conference convened by the Ministry of Agriculture in July 1979 in Balin Right Banner, Nei Monggol, and the rural livestock industry conference convened by the Ministry of Agriculture in October in Chengbu County, Hunan Province exchanged experiences, studied and formulated major measures for the development of the livestock industry in livestock and farming areas, and put forward a direction for the readjustment of the livestock industry. This called for a vigorous increase of the ratio of the livestock raising industry within agriculture, giving a position of equal importance to farming, forestry, and livestock raising; active readjustment of the internal composition of the livestock industry; emphasis on increasing the slaughter rate and output in a change from

past emphasis on year-end number of head in inventory; increase in the proportion of grazing livestock in the livestock industry; a change in the composition of herds with an increase in the proportion of female animals to accelerate the turnover of herds; as mechanization develops, development in the direction of using cattle not just as beasts of burden but also for meat, milk, as well as beasts of burden. These two conferences gave impetus to livestock production throughout the country.

(Hua Qiu [5478 6726])

#### Construction of Livestock Industry Bases

China has abundant fodder resources and resources in varieties of livestock for development as a livestock industry. Whether general methods will be adapted to local situations to make the most of these resources for the earliest possible development of China's livestock industry is a question that units in charge of China's livestock industry frequently ponder. In some places where conditions permit, establishment of livestock industry bases is one part of this effort. Some areas that the Ministry of Agriculture has cooperated with during the past several years, and which are currently under construction as livestock bases, are: commercial cattle bases, mostly distributed in some counties (or banners) in the provinces and autonomous regions of Heilongjiang, Jilin, Liaoning, Nei Monggol, Hebei, Shanxi, Hunan, Hubei, Guangdong, Guangxi, Sichuan, Yunnan, Guizhou, and Xinjiang. Milk goat bases are distributed principally in some counties in the middle of Shaanxi, in southern Shanxi, in west central Henan, in eastern Shandong, in central Hebei, and in eastern Zhejiang. Kidskin bases are distributed mostly in some counties in Xinjiang, Nei Monggol, and Gansu. Bases for sheep which are raised for sheepskins are distributed mostly in the Yinnan region of the Ningxia-Hui Autonomous Region. Fat lamb bases are distributed mostly in the Altai Prefecture of the Xinjiang-Uighur Autonomous Region. In addition, there are some other livestock bases such as bases for goat hides, fine-wool sheep, medium wool sheep, and beekeeping. In some of the bases where work got underway early, results are already apparent. In some commercial cattle bases, for example, in 1979 improved hybrid beef cattle supplied numbered 60,000 head. At the milk goat base in Fuping County, Shaanxi Province, there were more than 100,000 head of milk goats on hand in 1979, producing 1,000 tons of dairy products annually for sale in many large and medium size cities in the country. Additionally, each province, municipality, and autonomous region has adapted measures to local situations to build their own livestock industry bases, becoming major sources of livestock products for the local area. From the various kinds of animal husbandry bases built in Jiangsu Province, 1979 purchases of livestock products as a proportion of total livestock purchases in the province were as follows: fat hogs 48 percent, goatskin 61 percent, rabbits 90 percent, and geese 70 percent.

(Hua Mu [5478 3665])

#### Improvement in Livestock and Poultry Breeds

China's varieties of barnyard animals and poultry are extremely abundant, and numerous breeds have their own characteristics and economic value. Jiangsu and Zhejiang province's Taihu pigs and Jinhu pigs, Sichuan's Neijiang pigs and Rongchang pigs, Guangxi's Luchuan pigs, Guangdong's Dahua white pigs, Hunan's

Ningxiang pigs, and Liaoning's Xinjin pigs are all characterized by early maturity, tolerance of coarse fodders, and strong fecundity. Tibetan sheep, which live at elevations above 3,000 meters above sea level, have long hair of high elasticity, which is world renowned as rug wool. The Tan sheep from the Ningxia-Hui Autonomous Region and the Lake sheep from the Tai Lake region of Zhejiang and Jiangsu are famed for their lambskins and their sheepskins. The fine haired goats of Gai County in Liaoning and Alashan Left Banner in Nei Monggol usually produce between 300 and 400 grams of fine hair per animal. China also has quite a few fine breeds of cattle, donkeys, horses, and camels such as the yaks that grow on the Qinghai-Tibetan Plateau, have sturdy legs, can tolerate coarse feed, have strong resistance to disease, are called "ships of the plateau," and have very tasty meat. In order to steadily increase the production capacity of these superior breeds, the Ministry of Agriculture, in cooperation with some provinces and autonomous regions, set up some superior livestock and poultry breeding committees and breeding societies to which the state annually provides operating expenses. They organized farm for raising superior livestock by pertinent research units, people's communes, and agricultural institutions of higher learning for mutual cooperation in breeding work to increase steadily the superior characteristics of these livestock and poultry breeds.

China also had a large number of livestock and poultry breeds whose production characteristics are low and for whom importation of superior breeds is necessary for hybridization in order to improve the breed. After many years of effort in this regard, success has been achieved. As of the end of 1979, China improved fine-wool sheep and medium wool sheep and other cross-bred sheep totaling 3,368 head; Xinjiang fine-wool sheep, and northeast fine-wool sheep bred by China alone numbered more than 3 million. Wool quality basically met the requirements of the woolen textile industry. During the 1950's 80 percent of the woolen textile industry's needs for raw materials derived from imports; today the country is 80 percent self-sufficient. China's cattle were formerly used principally as beasts of burden, and their performance in the production of meat and milk was poor. Along with the mechanization of agriculture has come steps toward the use of cattle to produce meat and milk as well as to serve as draft animals. The Ministry of Agriculture and the agricultural and livestock departments of provinces, municipalities, and autonomous regions have, in recent years, imported from abroad superior cattle breeds for the production of meat and milk, and have set up a group of cold storage semen stations for popularization of cold storage semen breeding techniques for the energetic improvement of cattle breeds. By 1979, beef cattle herds already numbered 2 million head, and milk cows numbered 558,000 head. The number of cows bred through the use of cold storage semen totaled 1 million. By the end of 1979, two Holstein silk cow breeding cooperatives one in the south and one in the north had been established as well as national beef cattle breeding cooperatives, the Chinese superior fine wool sheep breeding committee, and the medium wool sheep breeding committee.

(Yang Mu [2799 36652])

#### Pilot Projects for the Modernization of the Livestock Industry in Pastoral Areas

China has exceptionally abundant grassland resources. In the northeast, Nei Monggol, the northwest, and southwest pastoral areas, the grassland area amounts to 4.3 billion mu of which 3.3 billion mu is usable grazing land. Since the

Founding of the Chinese People's Republic, great development has taken place in the livestock industry in pastoral areas. Livestock now number more than 80 million head for a 1.8 fold increase over 1949. Building of grasslands in pastoral areas is also actively underway. As of the end of 1979, enclosed range in the country's pastoral areas totaled 60 million mu; grass planted by man covered more than 10 million mu. Great development had occurred in grassland water conservancy construction. In order to bring about a fundamental change in pastoral area livestock industry dependence on natural grasslands for pasture, and the antiquated method whereby people and cattle followed water and grass, living wherever they found it, a modernized livestock industry had to be gradually built. In 1979, the Ministry of Agriculture in cooperation with concerned provinces and autonomous regions set up modernized pilot projects in 18 pastoral areas in nine provinces and autonomous regions with different types of grasslands in order to explore ways by which China's pastoral areas could effect a modernization of its livestock industry. These pilot projects may be divided into four types on the basis of their differing circumstances and missions. The first are a pilot project for the building of modernized grasslands located in Duerbote Mongolian Nationality Autonomous County in Heilongjiang Province, and in Guyuan County in Hebei Province.

Their main function is to explore the establishment of basic pasture lands that integrate grass, water, forests, and machinery, and to assess experiences in the growing of grass in arid areas. Second are comprehensive pilot projects for the modernization of the livestock industry. These are located in Xianghuang Banner, Zhengxiangbai Banner, Wushen Banner, and Ewenki Nationality Autonomous Banner of Nei Monggol, in Shiqu County in Sichuan Province, in Xinyuan County in the Xinjiang Autonomous Region, in Zeku County and Haiyan County in Qinghai Province, in Xiahe County in Gansu Province, and in Yanchi County in the Ningxia Autonomous Region. The pilot projects include the building grasslands, the mechanization of the livestock industry, improvement in livestock breeds, and prevention of epidemics through veterinary medicine. Third are pilot projects that combine livestock, industry, and commerce. These projects are located in Kuergai County in Sichuan Province, in Balin Right Banner and Ke'erqin Zuoyi Rear Banner in the Nei Monggol Autonomous Region, and in Fuyun County in the Xinjiang Autonomous Region. They are required to evaluate experiences in carrying out as a coordinated process of production, supply, and marketing on a foundation of modernized livestock production. Fourth are pilot projects founded on assistance from abroad. These are located at the Wengniute Banner Demonstration Livestock Farm in the Nei Monggol Autonomous Region, and at the Nanshan Demonstration Livestock Farm in the Chengbu Miao Nationality Autonomous County of Hunan Province. Through the introduction of production techniques and equipment from the livestock industry abroad, they are to provide experiences in improving the range, in feeding the livestock, and in pastureland administration and management. Eleven of these 18 pilot projects have continued operations from the foundation of pilot projects begun in 1978 as trial projects in grassland building.

(Yi Min [0001 3046])

#### Raising Rabbits

The raising of rabbits has been a major sideline occupation with a long history in China's rural villages. In 1979, 195 million rabbits were raised throughout the country, a 52.9 percent increase over 1978. Of this total, those raised for their

fur amounted to about 15 percent, and were distributed mostly in some of the counties of Jiangsu, Zhejiang, Henan, Shandong, Anhui, Guangxi, and Shanghai. Eighty-five percent of the rabbits were grown for their meat or skins, and these were distributed throughout the prefectures of Changji in Shandong, Zhangjiakou and Chengde in Hebei, Yinghua in Shanxi, Wenjiang and Leshan in Sichuan, Xuzhou and Huaiyin in Jiangsu, Anyang in Henan, Wumeng and Zhemeng in Nei Monggol, and Chaoyang in Liaoning. Most of them were raised by families, though some places operated collective rabbit farms. At the present time, the major species being raised are Angoras for their fur, and Qingzilan [7230 4793 5695], Large White rabbits, and Chinese domestic rabbits for their meat and skins. For almost 2 years, China has annually exported more than 2000 tons of rabbit fur in addition to rabbit skins and rabbit meat to earn foreign exchange amounting to more than 100 million dollars.

(Qiu Min [6726 3046])

### Apiculture

Great growth has taken place in apiary endeavors in China since Liberation. An Institute of apiculture was established in the Chinese Academy of Agriculture; the Fujian Academy of Agriculture established apiculture as a special field of study, and in Beijing and Shanghai, manufacturing plants for beekeeping appliances and plants for the utilization and processing of bee products have been set up. In 1979, China had 5,298 million bee colonies, a 9 fold increase over the period before Liberation, and a 21.1 percent increase over 1978. Of this total, state and collective bee farms and beekeeping by families of commune members amounted to about one-half. State purchases of commodity honey amounted to 110,000 tons, a 12-fold increase over 1957, and a 132. percent increase over 1978. Exports of honey totaled 50,000 tons, a 85 percent increase over 1978. The quantity of honey exports rose from third place in the world for the past several years to first place. China's capacity for the raising of bees is still very great. On the basis of existing major sources of nectar, China could have at least 20 million bee colonies. Along with afforestation and the planting of areas to flowers and grasses, nectar sources will become increasingly abundant and able to support more bee colonies. Scientific beekeeping is not yet universal in China, and honey yields average around 40 jin per mu.

The principal bee species raised in China are China bees and Italian bees. Second comes northeast black bees, Kanialan [0807 1441 7093 2374] bees, and Caucasus bees. China bees are used principally at fixed sites, and each bee colony produces from 10 - 50 jin of honey. Italian bees and other occidental bees are mostly moved around for feeding, and colonies produce from 80 to 200 jin of honey.

China abounds in nectar resources, the principal ones of which are rape, Chinese milk vetch, linden trees, dates, locust trees, the chaste tree, Chinese trumpet tree, white sweet clover, sesame, lichee, longan, citrus, cotton, alfalfa, shrub lespedeza, yajiaomu [7700 5183 2606], sunflower, buckwheat, Chinese tallow tree, and baizihua [4101 0459 5363] for a total of more than 20 species. In addition, there are large numbers of supplementary sources of nectar. Chinese milk vetch honey, locust tree honey, linden tree honey, and lichee tree honey have long enjoyed a fine reputation in international markets. China also produces royal jelly, beeswax, pollen, bee venom, and propolis.

(Qiu Bin [6726 2430])

## Sericulture

China is the place of origin for the world's sericulture industry, and the growing of mulberry to raise silkworms has a history of more than 4000 years. The cultivation of tussah silkworms also has a history of more than 2000 years. Two thousand years ago, Chinese silk was transported across Xinjiang to Central Asia and the countries of Europe. Silkworm cocoons are today still a major speciality of China, and silk is still a major Chinese export.

After 2 consecutive years of increased output, the output of silkworm cocoons in 1979 again saw a bumper harvest. Mulberry silkworm cocoon output totaled 4.267 million dan, a 6.9 fold increase over 1949 and a 23.1 percent increase in output over 1978. This was the highest year for production since the founding of the People's Republic. The major production areas of Sichuan, Zhejiang, Jiangsu, and Guangdong had a cocoon output totaling somewhat more than 3.6 million dan, or 86 percent of total national output. Sichuan Province, which ranks first in the country and which has developed fastest, had a silkworm cocoon output in 1979 totaling 1.48 million dan, which was equivalent to a 15.1 fold increase over 1949. In 1979 the country's output of tussah silkworm cocoons also increased for a total output of 1,148,000 dan, a 4.8 fold increase over 1949. Accompanying constant improvements in mulberry silkworms species and advances in the technology of scientific raising of silkworms, great increases have taken place both in per unit yields of cocoons and the quality of fresh cocoons. Average national cocoon yields from mulberry groves have increased from somewhat more than 20 jin per mu during the period immediately following Liberation to more than 60 jin, and some prefectures and counties have had yields of 100 jin per mu. There have been 200 jin per mu communes, 300 jin per mu production brigades, and more than 400 jin per mu production teams. Rate of silk output from mulberry silk cocoons has risen from 8.3 percent in 1949 to 11 percent.

Increased output of silkworm cocoons has increased the earnings of commune members in silkworm areas, has strengthened the collective economy, and has promoted the development of the silk industry and the marketing of silk goods both at home and abroad thus making contribution to the building of socialism.

Between late November and early December 1979, the Ministry of Agriculture together with the Ministry of Foreign Trade, the Ministry of Textile Industry, and the National Supply and Marketing Cooperative jointly convened a national conference on silkworm cocoon production in which preliminary planning ideas for mulberry silkworm cocoon and tussah silkworm cocoon production for 1980-1985 were aired, which studied various policies and measures for the development of silkworm cocoon production, and which called for the silkworm industry production to make a greater contribution to hasten the building of the four modernizations.

(Jing Zuoren [5427 0155 0088])

## Tea Cultivation

China is the original producer of tea, and tea production has a history of more than 2000 years. China's tea growing area is vast, tea varieties plentiful, and tea quality superior. Chinese teas enjoy a worldwide reputation. Annual production of tea is second only to India in the world. In addition to supplying all

nationalities within the country with tea to drink, China annually exports large quantities of it. It is a traditional Chinese export commodity.

In 1979, following 16 consecutive years of increased production, China's output of tea again increased totaling 5,542,000 dan or 6.8 fold more than in 1949 for the highest output year on record. The five provinces of Zhejiang, Sichuan, Hunan, Anhui, and Fujian had a total output of about 4 million dan, or 74 percent of total national output. Tea plantation yields in more than 40 counties reached or exceeded 100 jin per mu, and Jiangsu Province's yields were 109 jin per mu.

In 1979 one major feature of China's tea production was the special attention given everywhere to improving tea quality with general attention going to prompt picking based on standards, strengthening of the system of responsibility for production, and improvements in tea manufacturing techniques so as to improve the overall quality of the tea, particularly making substantial increases in the proportion of high and medium quality broken black teas. Broken black teas of high and medium quality accounted for 69 percent of Jiangsu Province's output in 1978; this climbed to 76 percent in 1979. In 1979, output of high and medium grade broken black teas from Lianyuan Prefecture in Hunan Province increased 20 percent over 1978. China's exports of all categories of tea during 1979 amounted to 2.13 million dan, a 23.2 percent increase over 1978 for a 23.4 percent increase in foreign exchange earnings.

In July 1979, the Ministry of Agriculture convened a national work forum on tea production and breeding of superior tea bushes in Fujian Province to discuss and propose policies and measures to be taken in future for tea production, and assigned tasks in surveying the varieties of tea plants and propagation of superior varieties.

(Jing Zuoren [5427 0155 0088])

#### Growing of Chinese Medicinal Materials

There are several thousand varieties of Chinese medicinal materials, which constitute a precious cultural heritage, play an important role in the prosperity of the Chinese race, and enjoy high esteem internationally. Following the founding of New China, both the party and the government gave extremely serious attention to work involving Chinese medicine. In 1955, the Chinese Medicinal Materials Company was established. In 1958, the State Council issued its, "Directive on Problems in the Development of Production of Chinese Medicinal Materials." In 1978, the State Council approved and sent forward its "Summary of the Conference on Chinese Medicinal Materials Production." At the same time, from the central government to local governments, a group of Chinese medicinal material research organizations were established. This series of measures gave great impetus to production and research in Chinese medicinal materials.

In a comparison of 1979 with the period immediately following Liberation, increases from 10 percent to several fold took place in the output of genuine medicinal materials such as Chinese angelica from Gansu, rhizome of Chinese gold thread [*Coptis chinensis*] from Sichuan and Hubei, and ginseng from the three northeastern provinces. Medicinal materials such as the tuber of elevated gastordia [*Gastrodia elata*], the tuber of pinellia [*Pinellia ternata*], and the root of balloonflower [*Platycodon grandiflorum*] have been brought under cultivation from a wild state. These plants

increased year after year to 56 varieties, some of which now largely supply needs. The area of cultivation of more than 100 kinds of medicinal plants such as dangshen [*Codonopsis pilosula*], fuling (*Poros cocos*), chrysanthemum, and Chinese yams has been enlarged. More than half of these items are supplied from the new areas. Imports from the south such as Aucklandia lappa, myrobalan [*Terminalia chebula*], pearls, bezoar, borneol, henon bamboo, and amber, are no longer necessary thanks to cultivation and artificial synthesis in China. In 1979, the area devoted to the growing of Chinese medicinal materials was 6.07 million mu, an almost twofold increase over 1957. In 1979, state purchases of Chinese medicinal materials totaled 980 million yuan in value, a more than two fold increase over 1957, substantially guaranteeing enough to meet the needs for prevention and curing illnesses plus exports.

(Long Jingjie [7893 4842 2720])

#### Rapid Development of Commune and Brigade-Run Enterprises

Rural commune and brigade operated enterprises were founded in 1958 during the People's Commune movement. During the 3 year period of hardships around 1962 when the national economy was undergoing readjustment, commune and brigade enterprises did badly. For the next 8 or 9 years, they virtually did not develop at all. In 1976, they began to gradually develop, and following the smashing of the "gang of four", in particular, they burgeoned and have now become a major component part of the national economy.

In 1979, except for Tibet, commune and brigade-run enterprises throughout the country numbered more than 1.48 million. Nationwide 99 percent of the communes and 91.6 percent of the brigades operated enterprises with an average 28 enterprises for every commune. Workers engaged in commune and brigade-run enterprises totaled more than 29.09 million, or 9.4 percent of the total workforce in the people's communes. Among the 1979 figures for commune and brigade enterprises, farming enterprises amounted to 30 percent, industrial enterprises 51.82 percent, and transportation enterprises 5.5 percent. Among commune-run industrial enterprises, machine industries and construction materials industries were standouts, the former being 28.1 percent, and the latter 19.1 percent.

In 1979, commune and brigade enterprise earnings totaled 49.11 billion yuan, a 13.82 percent increase over 1978. In 1979, total earnings from commune and brigade enterprises amounted to 29.83 percent of people's commune total earnings. In the 1979 commune and brigade enterprise earnings, agricultural enterprises accounted for 7.8 percent, industrial enterprises for 75.6 percent, transportation and communication enterprises for 4.7 percent, and construction enterprises for 7.1 percent.

The development of commune and brigade enterprises provided large amounts of funds for strengthening the collective economy and supporting the building of agriculture. In the 3 year period from 1977-1979, accumulated profits amounted to 23.44 billion yuan, of which about 6.75 billion was used to support the building of agriculture and for poor brigades. This was equivalent to 72 percent of direct state investment in people's communes. Accumulated profits of 13.38 billion yuan from these three years were returned to the brigades as wages thereby increasing the income of the commune members.

Development of commune and brigade enterprises provided large amounts of funds and raw materials to assist national construction. For the period 1970-1979, accumulated revenue payments to the state totaled 6.07 billion yuan; 276.334 billion tons of raw coal, 10,960.2 kilograms of gold, and 368,000 tons of sulfur were produced. The quantities of these three products formed a substantial portion of nationwide output, and other items such as bricks formed 63 percent of it, tiles 53 percent of it, and limestone 90 percent of it.

Development of commune and brigade enterprises also provided markets and the export trade with large quantities of items needed by the people in their daily lives and handicrafts. Output value of exports produced by communes and brigades in Fujian Province amounted to 25 percent of the province's total output value of exports, with handicraft items accounting for 63 percent of the total of such exports from the province. Firecrackers and broken black tea produced by commune and brigade enterprises in Hunan Province accounted for 75 percent of items purchased from the province for foreign trade.

As of the end of 1979, commune and brigade enterprise reliance on fixed assets purchased with their own accumulations amounted to 28.02 billion yuan and circulating capital amounted to 7.3 billion yuan. This has provided a definite material foundation for future development.

Accompanying development of commune and brigade enterprises has been the gradual establishment of administrative and management organizations for commune and brigade enterprises at all echelons throughout the country. Nationally, except for Shanghai and Tibet, all provinces, municipalities, and autonomous regions have established commune and brigade enterprise management bureaus. More than 70 percent of the prefectures (municipalities), more than 90 percent of counties, and more than 69 percent of communes have set up special organization for the management of commune and brigade enterprises. Administrative and technical management personnel at all echelons of commune and brigade enterprises throughout the country total more than 138,000 people. Nationwide, 26 provinces, municipalities, and autonomous regions have established commune and brigade supply and marketing organizations.

(Ren Qi [0117 0796])

#### Decisions on Certain Questions Concerning the Development of Commune and Brigade-Run Enterprises

The "Decisions on Certain Questions Concerning the Development of Commune and Brigade-Run Enterprises (Trial Draft)" was approved and promulgated by the State Council on 3 July 1979.

Affording to the central government's spirit of great development for commune and brigade enterprises, this document provided clear regulations for the direction of development, the program, and the policies of commune and brigade enterprises concerned. It directed that development of commune and brigade enterprises must adhere to the direction of socialism, and that they must serve agricultural production, the livelihood of the people, large industry, and the export trade. Commune and brigade enterprises must develop in accordance with local resources and social needs and suit measures to local situations without trying to "make bricks without straw." It clearly directed that the scope of their operations

should include the active development of farming and hatcheries, the efforts to develop agricultural byproduct processing industries, and the operation of industries to meet the needs of agriculture and construction materials industries. Where conditions permit, development of power industries and the five small industrial enterprises [producing iron and steel, coal, chemical fertilizer, cement, and machinery] is permitted as well as service trades such as communications and transportation, restaurants, and hotels. It also required that in the course of readjustment of the national economy, overall planning take all factors into account in the readjustment of commune and brigade enterprises, matters be arranged in an orderly way so as to achieve progress while readjusting, and improvements are made while restructuring. The document also provided concrete regulations for the strengthening of planning in production, supply, and marketing, and for the administration and management of enterprises.

(Ren Qi [0117 0796])

1979. Large Livestock and Sheep on Hand at Year End and Total Meat Production

Place		Large Livestock		Sheep	Total Meat Production*
		Total	Beef	(10,000 head)	(10,000 tons)
National total	全国总计	9,459.1	9734.6	18,314.2	1,062.35
Sichuan	四川	947.7	911.6	1,092.1	150.16
Guizhou	贵州	415.8	369.2	207.4	22.85
Yunnan	云南	654.8	551.9	702.1	25.90
Tibet	西藏	508.0	474.2	1,816.5	5.10
Shaanxi	陕西	245.1	176.0	649.3	19.81
Gansu	甘肃	372.6	210.8	1,112.6	12.90
Qinghai	青海	556.5	488.5	1,596.0	7.50
Ningxia	宁夏	55.5	18.4	319.6	1.55
Xinjiang	新疆	467.1	236.7	2,014.7	10.75
Henan	河南	521.5	339.4	1,107.8	53.02
Hubei	湖北	336.8	326.2	177.5	53.21
Hunan	湖南	329.7	328.7	87.7	77.49
Guangxi	广西	433.2	415.5	87.5	37.40
Guangdong	广东	383.2	383.2	40.8	62.39
Shanghai	上海	6.1	6.1	45.2	19.40
Jiangsu	江苏	120.4	105.9	615.7	94.60
Zhejiang	浙江	84.8	84.8	345.6	56.85
Anhui	安徽	264.4	217.2	363.1	50.85
Fujian	福建	99.5	99.2	68.8	20.94
Jiangxi	江西	212.1	212.1	10.5	30.15
Shandong	山东	344.1	221.5	925.8	72.95
Beijing	北京	31.0	10.1	57.3	11.35
Tianjin	天津	22.4	4.9	26.6	5.40
Hebei	河北	346.9	127.8	728.8	34.20
Shanxi	山西	222.5	108.2	920.8	13.90
Nei Monggol	内蒙古	685.3	354.0	2,632.3	20.85
Liaoning	辽宁	283.9	134.4	167.1	34.10
Jilin	吉林	234.2	110.7	149.3	20.45
Heilongjiang	黑龙江	273.9	107.4	245.7	36.30

\* 肉类总产量只包括猪、牛、羊肉。

\*Total meat production includes only pork, beef, and lamb.

**1979 Hogs on Hand at Year End & Number Slaughtered During Year**

Place	National Total	On Hand at Year End		Slaughtered (10,000 head)	Slaughter Rate (%)
		(10,000 head)	Estimated		
Sichuan	四川	5,092.2	5,736.0	64.2	
Guizhou	贵州	875.1	397.7	50.5	
Yunnan	云南	1,309.8	520.9	40.1	
Tibet	西藏	24.7	6.3	25.4	
Shaanxi	陕西	822.3	401.4	50.9	
Gansu	甘肃	440.0	255.3	53.7	
Qinghai	青海	76.3	33.7	39.9	
Ningxia	宁夏	64.9	28.5	39.6	
Xinjiang	新疆	103.7	64.6	62.5	
Henan	河南	1,592.3	807.2	46.8	
Hubei	湖北	1,748.8	1,026.7	60.2	
Hunan	湖南	2,120.5	1,589.9	85.9	
Guangxi	广西	1,103.0	683.2	65.8	
Guangdong	广东	2,009.5	1,109.2	56.0	
Shanghai	上海	342.4	417.6	114.2	
Jiangsu	江苏	2,356.1	1,832.2	84.8	
Zhejiang	浙江	1,550.0	1,271.7	95.3	
Anhui	安徽	1,131.9	691.6	59.3	
Fujian	福建	698.8	373.8	58.2	
Jiangxi	江西	1,004.7	653.7	69.2	
Shandong	山东	2,117.6	1,047.5	52.6	
Beijing	北京	246.8	199.6	80.4	
Tianjin	天津	100.8	77.4	77.1	
Hebei	河北	1,352.2	676.7	54.3	
Shanxi	山西	558.6	261.5	46.6	
Nei Monggol	内蒙古	554.6	256.5	47.0	
Liaoning	辽宁	1,188.9	592.9	50.1	
Jilin	吉林	585.7	282.2	48.5	
Heilongjiang	黑龙江	798.3	472.1	58.5	

**Aquatic Products**

**China's Aquatic Products Resources**

According to the documented record for China's resources of ocean fish, the Yellow Sea and Bohai contain 201 species of fish, the East China Sea 442 species, and the South China Sea 860 species. Allowing for duplication in figures for totals in each sea, and adding new species discovered as the result of investigation in recent years, ocean fish species total more than 1,300. Of these, hairtails, small yellow croakers, large yellow croakers, white Chinese croakers, chub mackerel, scad, sharks, drite, conger pike, mackerel, and black scrapers are distributed widely. Hairtails are found in all four of the seas, but their area of concentration is the Zhoushan fishing grounds in the East China Sea. Small yellow croakers are concentrated

principally in the middle and southern parts of the Yellow Sea. Large yellow croakers are found in both the East China Sea and the South China Sea. Though white Chinese croakers are widely distributed, their concentrations are greatest in the southern part of the Yellow Sea, and the middle part of the East China Sea, with some in the outer ocean. Fairly large schools of chub mackerel and scad occur in the Yellow Sea, the East China Sea, and the South China Sea. Sharks, skate, and conger pike are found in virtually every ocean area. Additionally there are the famous prawns (found in the Yellow Sea and Bohai), shrimp (largest amounts in Bohai), and cuttlefish (largest amounts in East China Sea).

Among shell fish resources, most common are oysters, razor clams, blood clams, ordinary clams, mussels, scallops, and abalone, which are found in all of the country's coastal seas. Aquatic plants include principally kelp and laver, the former being found only in the Yellow sea at one time, but successfully transplanted southward during the late 1950's. It is now quite plentiful in the East China Sea. The latter is distributed all along the coast, but in greatest quantities in the East China Sea.

China has more than 700 varieties of fresh water fish of which the black carp, grass carp, silver carp, flatheads, common carp, crucian carp, and bream are most widespread, and which are most readily raised by man. The chub salmon of the Heilongjiang Basin, the dace of the Pearl River Basin, and the huso sturgeon of Koko Nor are famous local aquatic resources.

(Yu Danu [0151 1129 1167])

#### Use and Protection of Aquatic Resources

Though China possesses abundant aquatic product resources, nevertheless, as a result of the contravention of natural laws and the upset of the ecological balance while developing and using these resources during the past 20 years, they have sustained serious damage. As a result of reckless overfishing and improper use of in-shore aquatic products resources, a tremendous decline has occurred in the quantity of economic fish varieties. Output of large yellow croakers, for example, declined from a maximum level of 190,000 tons per year to between 80,000 and 90,000 tons, and small yellow croakers declined from 160,000 tons to between 20,000 and 30,000 tons. Principally as the result of the construction of locks and dams that cut off channels for the migration of fish in inland waterways, the destruction of breeding and spawning grounds for fish resulting from filling in lakes to make farmland, and industrial wastewater, which has polluted the environment on which fish depend for their existence, quantities of fish caught in inland waters have declined in a straight line. Annual output was 600,000 tons during the late 1950's, 400,000 tons during the 1960's, and 300,000 tons during the 1970's.

In order to change this state of affairs, the National Aquatic Products Work Conference convened in February 1979 summarized the lessons of past experiences, and emphasized the necessity of the following for development of aquatic products production: a change from neglect of resources protection to vigorous protection and orderly use of resources; a change from primary reliance on catches to increase output toward gradual reliance on propagation; a change from sole pursuit of quantity of output to emphasis on improving quality. The forum of aquatic product bureau directors from 18 provinces, municipalities, and autonomous regions convened

in November of the same year reiterated this spirit. The forum further emphasized: the need for determined intensification of government management of fisheries, readjustment of in-shore operations; control over intensity of in-shore fishing and a seeking after truth in facts for a reduction in production quotas for ocean catches so that in-shore aquatic product resources might recuperate and multiply. They also called for full use of water surface resources for the development of ocean and freshwater propagation with a special centralization of forces to speed up the development of freshwater propagation, and devoting attention to the construction of commodity fish bases. They advocated raising fish in suburban areas and an expansion of raising fish by rural communes and production brigades to gradually increase the proportion of freshwater products in the total output of aquatic products.

(Yu Danu [0151 1129 1. 7.]

#### Promulgation of Regulations on Aquatic Product Resources Breeding and Protection

On 19 February 1979, the State Council promulgated the "Regulations on the Propagation and Protection of Aquatic Products Resources." This regulation contains a total of 20 articles in 8 chapters. The first chapter on general rules spells out the basis for promulgation of the regulation, its objective, and its principles. Chapter 2 defines the objects for protection and principles for making catches. Chapter 3 defines prohibited fishing zones and times when fishing is prohibited. Chapter 4 is on fishing tackle and fishing methods. Chapter 5 is on maintenance of the water environment. Chapter 6 is on rewards and punishments. Chapter 7 is organizational leadership and responsibilities. Chapter 8 is appendices.

In a "Circular on the Promulgation of 'Regulations on the Propagation and Protection of Aquatic Products Resources,'" the State Council noted explicitly that: aquatic products resources are a valuable source of wealth for the country, and that bolstering the protection of aquatic products resources to insure their normal multiplication and growth, is a major foundation for development of the aquatic products industry. Ensuring orderliness in the fishing industry, prohibition of rampant overfishing, and insuring that fishery water areas and aquatic creatures are not contaminated by pollution are a key measure in the protection of aquatic product resources. It is hoped that every jurisdiction and every sector will, in carrying out the main tasks of this new period, truly strengthen their leadership of aquatic products work, perfect government fishery organizations, outfit government fishery boats, vigorously conduct mass propaganda and education work, and strengthen the socialist system. Those who cause serious damage to resources shall be strictly dealt with, and in serious cases, a search will be made for those responsible for the crimes. Destructive activities of bad people shall be firmly attacked and punished in accordance with the law. Each jurisdiction and sector must act concretely in accordance with requirements stipulated in the regulations, implementing them in basic level units.

(Yu Danu [0151 1129 1167])

## Varied Structure of Ocean Fisheries Operations

China's four large seas cover an area of about 3.54 million square kilometers with Bohai covering an area of 80,000 square kilometers, the Yellow Sea an area of 440,000 square kilometers, the East China Sea an area of 860,000 square kilometers, and the South China Sea an area of 2.16 million square kilometers.

In 1979, China's ocean fishing industry had 42,779 motorized fishing boats of various kinds with a 1,293,479 gross tonnage and 2,924,600 horsepower. Non-motorized fishing craft numbered 120,000, with a total deadweight capacity of 363,000 tons. Owing to changes in resources and readjustment in in-shore operations, output from the ocean fishing industry during 1979 was 3,189,000 tons, 11.2 percent less than the 3.59 million tons of 1978. Of this total, output from catches was 2,773,000 tons, an 11.7 percent decrease from the 3.14 million tons of 1978, and a 13.2 percent decrease from the 3,195,000 tons of 1977, which was the highest year on record. The state-owned Ocean Fishery Company's part of the total catch was 522,000 tons, an 8 percent decrease from 1978's 568,000 tons. In terms of kinds of operations, output from each kind of major fishing operations and percentage of catch made through such operations was as follows: bottom trawling 992,800 tons or 35.8 percent; purse seining 674,000 tons or 24.3 percent; drift gill net 148,000 tons or 5.3 percent, hook devices 36,000 tons or 1.3 percent, and fixed position fishing gear and other operations 922,200 tons or 33.3 percent. Output from motorized fishing ships was 2,145,800 tons or 77.4 percent.

(Zheng Guobiao [6774 0948 2871] and  
Li Ming [2621 2494])

## Major Fishing Grounds and Fishing Ports

China's coastal seas are fertile and food for marine life abounds. The continental shelf is wide, and the marine climate has well defined seasonal changes. This plus the confluence in the coastal seas of the warm Taiwan current and the northern cold water mass produces numerous fishing seasons and fishing grounds, each with their own characteristics. The Bohai fishing grounds abound in shrimp resources, and are the main area producing shrimp in China for export. The Shidao fishing grounds are the spawning grounds for Yellow Sea cod, the overwintering grounds for shrimp and small yellow croakers, the channel through which numerous species of fish and shrimp migrate from the Yellow Sea and the Bohai, and is also the major fishing ground for Pacific herring. The Dasha fishing grounds are overwintering grounds for large and small yellow croakers and the Lusi fishing grounds are the place where large and small yellow croakers overwinter, spawn and search for food. At the Lusi fishing grounds, at the height of the season, annual catches of large yellow croaker run from 30,000 to 50,000 tons, and small yellow croaker run from 60,000 to 80,000 tons. Since 1974, resources have deteriorated, and output has fallen dramatically. In order to revive the regenerative capacity of fishery resources there, local fishery authorities took measures to reduce catches to the minimum during the yellow croaker fishing season in 1979. The Zhoushan fishing grounds are China's famous fishing grounds, providing large numbers of hairtails, large and small yellow croakers, and cuttlefish. Maximum annual output of hairtails was 570,000 tons. In 1979, the catch was 437,000 tons.

Southern Fujian, eastern Guangdong, and the mouth of the Pearl River are superb fishing grounds that produce prolific amounts of fish found in the medium and upper levels of the sea. Also, there is the Beibuwan fishing grounds where mostly bottom trawling operations are conducted.

Aside from a few fishing ports in the north, an overwhelming majority of China's coastal fishing ports are year-round ice-free ports. China has a total of 707 fishing ports, of which 336 are major ones. Of these, 27 are state-owned fishing ports. Fishing ports owned by the masses number 309. Most fishing ports are natural harbors lacking wharfs and facilities for shelter against the wind. Major fishing ports are Dalian, Haiyangdao, Zhangzidao, Chinhuangdao, Qikou, Dagu Hekou, Tianjin, Tanggu, Hangu, Changshandao, Yantai, Qingdao, Longkou, Shidao, Longxudao, Zhangjiaofou, Rushankou, Lidao, Shiyuesuo, Lanshantou, Lianyungang, Binhai, Xinyanggang, Liuhe, Shanghai, Ningbo, Shenjianmen, Shengshandao, Changyu, Shipu, Dachen, Sansha, Fingtan, Mawei, Xiamen, Dongshan, Shantou, Shanwei, Guangzhou, Dongping, Shekou, Xiangzhou, Zhapo, Bohe, Naozhou, Zhanjiang, Liusha, Wushi, Qishui, Haikou, Qingslan, Sanya, Baimajing, Beihai, and Qisha.

(Zheng Guobiao [6774 0948 2871] and  
(Li Ming) [2621 2494])

#### Maintaining Freshness and Processing of Fishery Products

China presently has four major methods of maintaining the freshness of aquatic products, including freezing, icing, slight freezing and chilled sea water. By the end of 1979, China had built 184 cold storage facilities with a refrigeration capacity of 160,000 tons per time, an ice making capacity of 6,600 tons per day, a freezing capacity of 5,500 tons per day, and an ice storage capacity of 140,000 tons per time. Of this total, 21 went into operation during 1979 with a refrigeration capacity of 23,900 tons per time, an ice making capacity of 1,122 tons per day, a freezing capacity of 1,163 tons per day, and an ice storage capacity of 27,690 tons per day.

During this year, state-owned fishing ships all revived measures of sorting, classifying, loading into chests, and adding ice to maintain freshness for a corresponding improvement in the quality of fish. Collective fishing industry motorized fishing boats were refitted with insulated storage and carried ice. Processing of fish includes canning, fish paste products, dried products, fish powder and salted products, but these are small in scale, have simple equipment, and low efficiency rates. They await future improvements and strengthening.

(Zheng Guobiao [6774 0948 2871] and  
(Li Ming) [2621 2494])

#### Ocean Propagation Industry

China has numerous natural ports, bays, and islets, and the shallow coastal areas and beaches are vast, providing extremely fine natural conditions for the development of seawater propagation. In 1979 the total area devoted to seawater propagation in China is somewhat more than 1.74 million mu with an output of 416,000 tons, amounting to 15 percent of the output of the ocean fishing industry, and a 6.2 fold increase over 1952. Species propagated include principally prawns, hairtails,

mussels, laver, razor clams, and oysters. Kelp and mussel output represents a large proportion of the output of seawater propagation, with hairtails amounting to 17,000 tons or 57.6 percent of the propagation output, and mussels amounting to 6,000 tons or 17.2 percent of propagation output. Other species include oysters and razor clams amounting to 19.1 percent; laver, shrimp, blood clams, and ordinary clams amount to 6.1 percent. Species showing an increase over 1978 include laver, prawns, razor clams and oysters. A slight decrease occurred in hairtail output, while a marked decline took place in mussel output.

Since 1977, the propagation of prawns has shown definite development. Propagation areas expanded from 17 counties in 1978 to 50 counties and municipalities in 1979. The propagation area increased from 20,000 mu in 1978 to 110,000 mu in 1979 for a 4.5 fold increase. Output was 1,245 tons, a 1.8 fold increase over 1978. Propagation of razor clams has a long history and experiences are abundant. In recent years, enclosed ponds have been used in which the larvae can affix themselves. Larvae growing bases have been established with the popularization of growing razor clams in water accumulated during high tide. There has also been development of low tide areas. Both the area of propagation and output have increased. In 1979, the razor clam propagation area amounted to 123,000 mu with an output of 52,000 tons, a 10.6 percent increase over 1978. In the raising of oysters, attention was given to changes in the antiquated propagation method of casting in stones. Instead, high output methods using concrete pillars and rectangular slabs of stone have been popularized with definite effectiveness. In 1979, the oyster propagation area increased by 30,000 mu over 1978, and output also increased slightly. In addition, the propagation of scallops, beche-de-mer and abalone as well as fish have been vigorously developed.

(Sun Ximo [1327 0823 2875])

#### Freshwater Fishery Production

China is one of the countries of the world with a fairly large water surface area. According to 1974 statistics, it has about 250 million mu of watersurface, of which 114 million mu are rivers, 84 million mu are lakes, 32 million mu are reservoirs, and 20 million mu are ponds. Fish resources abound in the famous Chang Jiang, Huang He, Pearl River, Heilongjiang, Songhuajiang, and in Taihu [Lake], Hongze Lake, Boyang Lake, Dongting Lake, Chao Lake, Hong Lake, Xingkai Lake, Dalai Lake, and Ningbo Lake. All are good grounds for fish production. Ponds, small streams and medium and small lakes and reservoirs provide excellent conditions for artificial propagation and the development of a freshwater fish industry.

During the 1950's, China's freshwater fishing industry production steadily developed. Following the national economic difficulties of the early 1960's came the destruction caused by the ultra-left line of Lin Biao and the "gang of four" as a result of which annual output of the freshwater fishing industry declined, fluctuating between 800,000 and 900,000 tons. During this period, as a result of the interdiction of rivers and the building of dams, which cut the fish's migration routes, the lopsided emphasis on "taking grain as the key link," and the blind filling of lakes to create farmland, more than 20 million mu of lakes disappeared, destroying the spawning and feeding grounds of non-migratory fish. This plus the discharge into rivers and lakes of industrial pollutants seriously damaged natural fish resources, and quantity of catches continuously declined. In the 1970's, great growth took

place in freshwater hatchery output, particularly in the construction of intensive propagation and high output fishponds, which brought about a gradual resurgence in the output of freshwater fish. In 1979, freshwater fish output amounted to 1,115,000 tons, of which the output from hatcheries was 813,000 tons. Communes and brigades accounted for 90 percent of the production of the entire freshwater fishing industry.

(Sun Jiayi [1327 0857 0308], (Xiang Siwei) [7309 2448 5633], (Sun Zhenxing) [1327 2182 5281])

### Development of Freshwater Pisciculture

China has a long history of freshwater pisciculture, and it was the first country in the world to raise pondfish. A record of the raising of fish goes back to the 11th century B.C. at the end of the Yin and the beginning of the Zhou dynasties. Nevertheless, for a long period time prior to Liberation, development of freshwater fish production was extremely slow, and right up until the period immediately following establishment of the People's Republic the foundation for fish propagation was still very fragile. The utilization rate for water surfaces was only two or three percent, and mostly concentrated in pond pisciculture in Nanhai, Zhongshan, and Shunde counties on the Pearl River Delta in Guangdong Province and in Wuxian, Wuxi, Wujiang, and Wuxing counties around Taihu [Lake] in Jiangsu and Zhejiang provinces, and in the raising of fishes in the outer marshes of Shaoxing and Deqing counties. After 30 years of efforts, the situation in freshwater pisciculture is vastly different from what it had been. The propagation has spread everywhere in the country to an area of more than 40 million mu for a 54.5 percent utilization of water surfaces suitable for raising fish. Of the total, apart from more than 10 million mu of ponds in which fish are raised, another almost 30 million mu of medium and small lakes and reservoirs are used for the raising of fish. Yields average nearly 40 jin per mu. Species raised have increased to more than 10. In addition to black carp, grass carp, silver carp, flatheads, bream, common carp, and crucian carp, [other fish such as] *Megalobrama amblycephala* Yih, *Xenocypris argentea* Gunther, rainbow trout, dace, mullet, and *Tilapia mossambica* are also being raised. A breakthrough in 1958 in the technique of artificial propagation of grass carp, silver carp, and flathead fry, which after being widely popularized, gave great impetus to the development of the freshwater pisciculture. In recent years, more and more rural communes and brigades have come to regard the raising of fish as an important way to become prosperous, and this will give greater impetus to development of freshwater fish production.

In order to gradually solve the problem of edible fish for people in cities and industrial and mining areas, beginning in 1973 emphasis was given to suburban pisciculture. For several consecutive years, more than 130 large and medium-sized cities used 3.5 million mu of water surfaces for the raising of fish, producing 130,000 tons of fish annually. From 400,000 mu of these fishponds where fish were intensively raised, yields averaged more than 230 jin per mu. In recent years, the pisciculture in the suburbs of Wuhan has developed quite rapidly. In 1979, fish were raised on 500,000 mu for an output of 18,660 tons of fish, or an average 13.3 jin of fish per capita for the entire city. Since the winter of 1977, 250,000 mu of centralized, continuous high output fish ponds have been built as bases for commercial fish. In 1979, 112,200 mu were put into production, producing more than 6000 tons of fish which played a definite role in supplying large cities.

Additionally, though the raising of fish in net cages is a technique that has just begun during the past several years, no matter whether used for pisciculture or for breeding, it has been effective in producing high output. Yields per mu are more than 10 times those obtained from conventional pond breeding. According to 1979 statistics from 19 provinces, municipalities, and autonomous regions, there are more than 2,000 mu of net cages.

(Sun Jiayi, Xiang Siwei, Sun Zhenwing)

#### Artificial Propagation and Release of Crab Larvae

River crabs are widely distributed within China. From the Yalu Jiang in the north to the Leizhou Peninsula in the south, they can be found in the lower reaches of virtually every river that flows into the sea. Formerly there was the Shengfang crab from Hebei, the Yangcheng Lake giant crab from Jiangsu, and the Nan Lake crab from Zhejiang, all of which were renowned in China and abroad; their output was also very high. During the 1950's only Jiangsu Province's output was above 10 million jin; output from Baiyangdian Lake in Hebei was between 400,000 and 500,000 jin. Beginning in the 1960's, river crab resources were seriously hurt as a result of the building of water conservancy projects, the construction of dams and the installation of gates, which cut off the river crab migration routes and impaired the breeding and growth of river crabs. Output declined sharply, and in many lakes they are on the verge of extinction.

Responding to declining river crab resources, Jiangsu Province began experiments in 1969 in the release of crab larvae into Taihu [Lake], Hongze Lake, and Gaobao lake. In 1979, output reached 15.5 million jin exceeding by 7 percent annual average output during the 1950's. Experiences in Jiangsu Province for the past 10 years have shown that release of crab larvae is an effective means to revive and increase the breeding of river crab resources, and increase output of them. Since the mid-1970's, each spring and summer, more than 20 provinces, municipalities, and autonomous regions carry crab larvae they have purchased to Chongming Island at the mouth of the Yangtze River, where they release them into lakes. This has been very effective. Numerous lakes have revived their historical output, and some lakes that formerly had no crabs now have substantial outputs.

Because of weather, volume of water and other natural conditions, a great inconsistency exists in collecting natural crab larvae. Since 1975, aquatic products institutes in Zhejiang, Anhui, and Jiangsu have experimented with the artificial breeding of crab larva and have had some initial successes.

(Sun Jiayi, Xiang Siwei, Sun Zhenxing)

#### Culturing of Pearls in River Mussels

China began use of river clams for the cultivating of pearls at a rather early date. A record from the Tang dynasty tells of the construction of pearl ponds for culturing. However, the freshwater pearl culturing industry did not take off until after 1958. Most commonly used in the culturing of pearls is the *Hyriopsis cummingii*, followed by the *Cristaria plicata* and the *Anodonta woodiana*. In the vast internal waters of China, river clams resources are abundant and artificial breeding techniques have also been successful. This provides excellent conditions for development

of freshwater pearl culture endeavors. Currently in the more than 10 provinces, municipalities and autonomous regions of Jiangsu, Zhejiang, Shanghai, Guangdong, Guangxi, Hunan, Hubei, Hubei, Anhui, Jiangxi, Shandong, and Fujian, pearls are being cultured with an annual output of more than 30,000 jin. Jiangsu Province produces most with its total output accounting for more than 80 percent of the national total. Medicines, cosmetics, and adornments such as pearl wine, pearl eye lotion, pearl face cream, pearl necklaces, have a ready market both in China and abroad.

(Sun Jiayi, Xiang Siwei, Sun Zhenxing)

#### Cultivation of Aquatic Crops

Use of rivers, lakes, sinkholes, ponds, and lowlying land to plant and grow aquatic crops has a more than 3000 year history in China. Types of plants grown are numerous, among them aquatic starch crops such as water caltrops, lotus root, arrowhead, water chestnuts [*Eleocharis tuberosa*] and wild calla; those used as industrial raw materials such as mat grass, cattail stems, reeds, and rushes; those used for fodder or fertilizer such as duckweed, *Alternanthera philoxeroides*, water hyacinths, water cabbage and annual wild rice (*Zizania aquatica*); those used as vegetables such as wild rice, water fennel, and water shield; and those used as pharmaceuticals or tonics such as lotus seeds, cattail pollen, and Gorgon fruit.

Following Liberation, aquatic resources received wide-ranging attention and use. The area planted to various kinds of aquatic crops steadily increased, and output steadily climbed. At the end of the 1960's and in the early 1970's, this was seriously damaged for a time, but the last 2 years have seen the beginning of revival and development. Hunan, the main area for the growing of lotus seeds, planted an area of 91,000 mu in 1979, which was 51 percent of the maximum area ever planted. Output was 5.2 million jin, exceeding by 3 percent the highest output of record. Hunan's Xiangtan Prefecture, where growth has been fast, planted 3,850 mu of lotus in 1978 for an output of 320,000 jin. In 1979, the area was increased to more than 16,000 mu, and output was more than 1.93 million jin. Bositeng Lake in Xinjiang Province, a prolific producer of reeds, has more than 200,000 mu of reeds with a constant annual output of 60,000 tons or so that supplies more than 10 provinces and municipalities nationwide.

(Sun Jiayi, Xiang Siwei, Sun Zhenxing)

#### State Farms and Land Reclamation

##### Development of China's State Farms

China's state farms are agricultural enterprises owned by all the people. They date back to 1947 to the time of the CCP's founding of northeastern bases in Heilongjiang Province. Following establishment of new China, large numbers of commanders and fighters of the People's Liberation Army were stationed in border regions to open up territory. Later they were transferred to civilian work in other regions, most notably in Heilongjiang, Xinjiang, Hainan Island, and Xishuangbanna to open land for agricultural use. They set up state farms in groups devoted largely to the production of grain, soybeans, natural rubber, and livestock products to form

the four large reclamation areas in Heilongjiang, Xinjiang, Guangdong, and Yunnan. Meanwhile, each of the provinces, municipalities, and autonomous regions set up a series of state farms. During the Great Cultural Revolution, the Ministry of State Farms and Land Reclamation was abolished as a result of the disturbance and destruction caused by Lin Biao and the "gang of four." Most provincial, municipal and autonomous region state farms and land reclamation departments were also cut back. Numerous state farms were transferred to lower levels, some of them becoming people's communes and some of them being dismembered. Thus the building of production and administration and management were dealt a serious blow resulting in lower output and an increase in losses.

Following the smashing of the "gang of four," the State Council convened the National State Farm Work Conference in late 1977 and early 1978. Here it was proposed that state farms would be built with all possible speed into national bases for the production of commodity grain, industrial raw materials, non-staple foods for urban areas, and exports for foreign trade, and that they would perform an exemplary leading role in effecting the modernization of agriculture. In order to fulfill these tasks, commensurate readjustments were made in the system of management, the first of which was establishment of the State Bureau of State Farms and Land Reclamation with the subsequent revival in 1979 of the Ministry of State Farms and Land Reclamation. The four large reclamation areas in Heilongjiang, Xinjiang, Guangdong, and Yunnan now came under the dual leadership of the central government and the province or autonomous region in a system of leadership in which the province and the autonomous region was paramount. The provincial farms that had formerly been downgraded to prefecture or county again came under unified provincial leadership. The state farm and land reclamation administrative organizations in each province, municipality, and autonomous region were also revived and strengthened.

In 1979, China had 2,047 state farms employing 4.81 million people on 65.36 million mu of cultivated land. They provided the state with products, most notably grain, soybeans, cotton, dry rubber, edible oils, pork, tea, fruits, ginseng, and deer horn. Milk supplied to urban areas came mostly from these farms. Additionally, they provided small quantities of other tropical economic crops such as sisal hemp, oil palm, coffee, spices, and pepper. China's exports of soybeans, ginseng, and deer horn are derived principally from these farms. The fruits, teas, force-fed ducks, and other meats produced on these farms were also principally export items. In the industrial field, in 1979 China's state farm and land reclamation system had 6,183 industrial enterprises with 14 percent of the total number of people employed on the farms and producing 48 percent of total output value. Many of the industrial goods from state farms such as Shanghai's bicycle locks, and Tibet's felt, rug yarn and wool are also export items.

(Qian Tiefang [6929 6993 5364])

#### State Farms Enterprises Convert Losses Into Profits

The year 1979 was the year in which state farm enterprises administration and management work turned the corner in a change from many years of losses.

Improvements in administration and management of state farm enterprises played a major role in turning around the loss situation. In February 1979, the State Council approved and sent forward the State Bureaus of State Farms and Land Reclamation, and

the Ministry of Finance's "Provisional Regulations on the Institution of Fiscal Contracting for Work in State Farm Enterprises." These regulations required that during the period from 1979 to 1985 state farm enterprises institute independent accounting, personal responsibility for profits and losses, no subsidization of losses, self-help in the development of production from profits, and use of financial contracting for work which used loans when funds were insufficient. In this way, state farm enterprises became the first industries in the country to institute fiscal contracting for work. This was a major reform in the administration and management of state farm enterprises. This method enlarged the autonomy of enterprises, bolstered the economic responsibility of enterprises, spurred enterprises to improvements in administration and management, strengthened economic accounting, and focused serious attention on economic results. Numerous farms also instituted "guaranteed rewards," and bonuses on top of basic wages for their basic level production units, and expanded the autonomy of basic level production units. All production units that are well managed have a certain amount of reserve funds for use in further expanding production and for improving the lives of employees, thus linking employee income to successful production by the enterprise.

Financial contracting for work gave impetus to the development of production, and numerous farms used every manner of means to open production avenues, adapting measures to suit local situations for the development of industrial and agricultural production. In 1979, both output of major agricultural and livestock products produced by state farms nationally and the amounts sold to the state showed tremendous increases over 1978. Total output of grain and beans was 14.07 billion jin, an 8.9 percent increase. Quantities of grain and beans sold to the state amounted to 4.86 billion jin, a 27.2 percent increase. Cotton output totaled 1,609,000 dan, a 9.1 percent increase. Total output of edible oils was 2,101,000 dan, a 23 percent increase. Dry rubber output totaled 99,426 tons, a 4.6 percent increase. Milk output totaled 599.48 million jin, an 11.4 percent increase. Meat sales to the state totaled 224.22 million jin, a 27.9 percent increase. Gross value of industrial and agricultural output in 1979 increased 11.4 percent over 1978. Of this total, the gross value of agriculture output increased from 3.776 billion yuan to 4.215 billion yuan, an 11.6 percent increase. Gross value from industry output increased from 3.534 billion yuan to 4.215 billion yuan, an 11.1 percent increase.

(Zao Xuezhi [2580 1331 2535])

#### trial Operation of Integrated Agricultural, Industrial, and Commercial Enterprises

"The Decision of the CCP Central Committee on Some Questions Concerning the Acceleration of Agricultural Development" noted that state farms should "engage in diversified operations, operating agricultural and livestock product processing industries, develop commercial enterprises for the marketing of their own products, and establish with all possible speed integrated agricultural, industrial, and commercial enterprises to play an exemplary leadership role in the modernization of agriculture." During the fourth quarter of 1978, China's agriculture and land reclamation system began trial operation of integrated agricultural, industrial, and commercial enterprises. By the end of 1979, the state farm and land reclamation system had a total of 87 units nationally which were engaged in pilot projects in integrated agricultural, industrial, and commercial enterprises. The form of these pilot projects was adaptation of general methods to local situations, flexibility, and diversification. As to the relationship between the state farm and land

reclamation system or between units internal to a farm, some farms forged economic cooperation with industrial and commercial enterprises outside the state farm and land reclamation system; and other farms linked up economically with people's communes or production teams, etc. These pilot projects units began to change from the situation of many years standing of sole devotion to agriculture to the development of processing industries and commercial enterprises for agricultural and livestock products, carrying out production, processing, marketing and sales as "a coordinated process." Already they have given some initial evidence of the superiority of integrated agricultural, industrial and commercial enterprises. Reliance on processing and marketing has won profits, increased capital accumulation, and promoted development of agricultural and livestock production. Opportunities exist for excess labor, which helps increase the labor productivity rate. By linking together several units for the joint raising of funds, production tasks which a single production unit would have been hard put to operate may be established, and the scale of production can be increased. Through direct marketing and sale of one's own products, intermediary links can be reduced, and storage and transportation expenses can be cut, which helps the masses and enlivens the market. Use of integrated enterprises that combine processing, marketing, and sales methods, linking up with surrounding communes and brigades, and returning a portion of profits to production teams, increases commune and brigade earnings, and cements the relationship between the farms and the communes and brigades. Comparison of 26 state farms with combined agricultural, industrial, and commercial enterprises in Chongqing during the period January to September 1979 with the same period in 1978 shows that they increased supplies of milk by more than 2.2 million jin, milk powder by 623 tons, and tea leaves by 900 dan, and profits increased 45.8 percent. In February 1979 Tuanshi Land Reclamation Farm in Qu County in Zhejiang Province joined with four neighboring communes and 55 production brigades to operate an integrated agricultural, industrial, and commercial enterprise.

In comparison of 1979 with 1978, grain output increased 15.4 percent; tremendous increases occurred in output of economic crops such as sesame, melons and beans, citrus fruits, and sugar with output of sesame tripling. The quantity of hog feed increased 26 percent; state procurement of chicken eggs increased 1.2 fold; and annual gross value of output increased 31 percent.

By way of making a prompt summarization of pilot project experiences, and in order to resolve conflicts between the test run of integrating agricultural, industrial, and commercial enterprises and the existing system of economic management and existing economic policies, the Ministry of State Farms and Land Reclamation convened a pilot project report meeting from 22 August to 5 September 1979, which was attended by integrated agricultural, industrial and commercial enterprises from state farm and land reclamation departments in 12 provinces, municipalities, and autonomous regions. Additionally, in order to organize well the integrated agricultural, industrial, and commercial enterprise pilot project work, and link production, supply, and marketing channels, the Ministry is preparing to set up a Chinese General State Farm and Land Reclamation Integrated Agricultural, Industrial and Commercial Enterprises Company.

(Liu Liangyu [0491 5328 3768],  
Kong Qingzhi [1313 1987 0037], and  
Xia Hanxin [1115 3352 2450])

## State Farm Mechanization Pilot Projects

In order to gain experience in the mechanization of agriculture, a group of comprehensive and individual mechanization pilot projects have been provided for at state farms, which in 1979 showed quite good results, creating quite high labor productivity rates and commodity rates.

In the north, a dry field mechanization pilot project was located at the Second [Production] Team, Fifth Branch Farm, Youyi Farm, Heilongjiang Province. This was a completely mechanized comprehensive pilot project using equipment imported from abroad, with a quite high level of mechanization and employing techniques such as spray irrigation and chemical eradication of weeds. This team tilled 25,000 mu of land. It had a total of 39 people, 20 of whom were farm workers. In 1979, its total output of grain and beans was 8,778,000 jin for yields averaging 351 jin per mu, and a 93.2 percent commodity rate. Each agricultural worker produced an average 438,000 jin of grain and beans to create a 14,800 yuan profit. In terms of total labor used in production, each person produced an average 240,000 jin of grain and beans to create 8,147 yuan in profit. The 15th Production Team of Suibin Farm in Heilongjiang Province is a production team equipped with Chinese made farm machines cultivating an area of 16,000 mu with 34 farm workers. In 1979 its output of grain and beans totaled 4.47 million jin, an average 130,000 jin of grain and beans per farm worker to create a profit of 4,400 yuan. The Second Team of the Zhigou Branch Farm of Huguang Farm in Guangdong Province is a mechanized production team in the south that directly sows rice. It grew 978 mu of rice for an output totaling 594,000 jin using 18 farm workers who produced an average 33,000 jin per person.

Use of aircraft to sow seeds and to tend crops (including the application of fertilizer, chemical eradication of weeds, and prevention and control of disease and insects) has shown striking results in increasing labor productivity in the growing of rice. In 1979, the Qingshui Farm in Liaoning Province experimentally farmed an area of 2,000 mu with one person responsible for 65 mu. Paddy output totaled 1,468,000 jin, an average of 47,300 jin per farm worker.

Experimental use of spray irrigation in Xinjiang and Heilongjiang farmlands and on Guangdong tea plantations have demonstrated increases in output, savings of water, savings of labor, conservation of land use, and prevention of erosion. It has broad prospects.

(Yu Xiang [0151 4382] and  
Xia Hanxin [1115 3352 2450])

## Agricultural Science Research and Education

### Revival and Development of Agricultural Research

In old China, agricultural science research work was extremely weak. Following Liberation, six large regional agricultural science institutes were set up in the northeast, north China, east China, south China, the northwest, and the southwest. Provinces (municipalities and autonomous regions) and regions (leagues and municipalities) also set up agricultural science institutes or experiment stations.

In 1957, the Chinese Academy of Agricultural Sciences grew out of the North China Institute of Agricultural Sciences. Subsequent to 1958, some provincial agricultural sciences institutes were enlarged to become provincial academies of agricultural sciences. During the Great Cultural Revolution, as a result of the interference and destruction caused by Lin Biao and the "gang of four's" ultra-leftist line, some of the institutes of the Chinese Academy of Agricultural Sciences and numerous provincial (municipal, autonomous region), and prefectural (league and municipal) agricultural science research organizations were abolished or downgraded, and research work in agricultural sciences was seriously crippled.

Following the smashing of the "gang of four," a national science conference was convened in 1978; the State Council approved the revival of the Chinese Academy of Agricultural Sciences, and research in agricultural sciences was revived and developed. In 1979, the "Decision of the CCP Central Committee on Some Questions Concerning the Acceleration of Agricultural Development," which was passed by the Fourth Plenary Session of the 11th Party Central Committee, placed specific requirements on the development of research work in agricultural work. The Ministry of Agriculture placed strong emphasis on building up the Chinese Academy of Agricultural Sciences, requiring that it gradually begin to operate national research centers for agriculture and livestock raising. Also established were such national agricultural research organizations as the Chinese Agricultural Engineering Research and Design Academy, the Chengdu Methane Gas Institute and the Environmental Protection Scientific Monitoring Institute. Each province (municipality and autonomous region) revived and established provincial academies of agricultural sciences and prefec-tural academies of agricultural sciences. Some provinces (municipalities and autonomous regions), as well as a small number of prefectures also established special research units directly subordinate to agricultural and livestock depart-ments. Some institutions of higher learning also set up laboratories for strengthening research work in agricultural sciences.

By adopting the method of combining specialized teams with the broad masses, research work in agricultural sciences launched a wideranging campaign of scientific experiments in agriculture from which numerous scientific and technical accomplishments were derived. At the National Science Congress in 1978, 243 prizes were awarded for major scientific and technical accomplishments in agriculture and livestock raising. Thirty of these approached, attained, or exceeded advanced world levels. For example, in the field of agriculture, in 1956 the world's first dwarf superior variety of rice, "Aijiao Nante" was bred. In 1973, an improved xian type hybrid rice was grown; and an allooctoploid triticale was propagated using polyploid breeding methods. Research in control of saline-alkaline fields brought results that laid a scientific foundation for the control of lar e areas. Insect pests and diseases that cause serious damage to agricultural production such as migratory locusts and wheat rust have been substantially brought under control. In the field of animal husbandry, research was launched on improvements in domestic livestock and domestic poultry breed, and in artificial insemination techniques using frozen semen for domestic livestock. Research has been successful with numerous safe vaccines. Pernicious epidemic diseases including rinderpest, hog cholera, and chicken pest, which were virulent before Liberation have either been brought under control or eradicated.

(Wang Zhiqi [3769 0037 3823])

## Building an Agricultural Science and Technology Popularization Network

Agricultural science and technology popularization network is the common way of referring to the agricultural science and technology popularization organization. It was formed out of the former agricultural technical popularization stations and the four level agricultural science experimental network. It includes all agricultural science and technology popularization organizations from the central authorities to the grassroots levels. At the center, a science and technology popularization department has been established within the Science and Technology Bureau of the Ministry of Agriculture. In provincial and prefectural agricultural bureaus, agricultural science and technology popularization stations have been established or else are administered by appropriate units within agricultural bureaus. In the counties, either agricultural science and technology popularization offices or agricultural science and technology popularization stations have been established. People's communes have agricultural science and technology popularization stations; production teams have set up either agricultural science and technology teams or agricultural technicians. Agricultural science and technology popularization organizations at all echelons at or above the county are subordinate to the national institution. Some of the commune agricultural science and technology popularization stations are subordinate to the national institution, and some are subordinate to collective units. Production brigade and production team agricultural science and technology teams are mass scientific and technical organizations.

The agricultural science and technology popularization network is a link and a bridge for the application to agricultural production of agricultural research accomplishments and advanced techniques; it is the key link in giving play to the productivity role of science and technology. Its principal tasks are: adaptation of general methods to local situations for the popularization of advanced techniques in agricultural production, all around implementation of the "Eight-Point Charter for Agriculture", and implementation of scientific farming. Below the county level, it performs experiments and demonstrates, promotes and gives technical training. It firmly follows the direction which serves present and local agricultural production and holds to a policy at which popularization is the center. It upholds all principles and all model demonstration methods that have undergone testing. It organically combines experimentation, demonstrations, training, and popularization work, gains experience through experimentation, derives models through demonstrations, develops backbone technical cadre through training, and achieves the goal of increased output and increased income through the popularization of applications to production.

In the course of their work, agricultural scientific and technical popularization organizations give attention to close coordination with research units, and agricultural institutions of higher learning, actively promote their scientific and technical accomplishments, and request their assistance in the solution of technical problems they may encounter in the process of popularization.

(Yao Jiaqi [1202 0857 4428])

## Revival and Development of Agricultural Institutions of Higher Learning

Following the smashing of the "gang of four," China's agricultural institutions of higher learning made an initial recovery and moved forward. In 1979, of 15

Institutions including Beijing, Hebei, Yunnan, and Yilin agricultural universities, and Nanjing, Shenyang, Anhui, and Northeast agricultural colleges that had been moved, 12 returned to their previous addresses. Simultaneous with the revival of the old schools, the state also approved the founding of an additional 10 schools of the Beijing and Laiyang Agricultural College, the Tibetan College of Agriculture and Animal Husbandry, the Jinyang, Xichang, and western Henan professional schools of agriculture, the Sichuan and Qinghai animal husbandry, and veterinary medicine colleges, the Zhelimu Academy of Animal Husbandry, and the Zhengzhou Professional School of Animal Husbandry and Veterinary Medicine. By the end of 1979, there was a total of 43 agricultural institutions of higher learning (not including state farm and land reclamation, farm machinery, and forestry institutions) of which 35 offered regular college courses, and 8 offered specialized courses. In terms of curriculum, 37 were in agriculture and 5 were in animal husbandry and veterinary medicine; one was in sericulture. There were 360 institutions offering 52 different courses on agriculture, pomology, vegetables, livestock, veterinary medicine, agricultural mechanization, farmland water conservancy, and forestry. There were more than 45,000 students enrolled, 477 researchers, and a staff of more than 28,000 at the schools. The state also revived and authorized as key national institutions of higher learning seven institutions, namely, Beijing Agricultural University, and Nanjing, Southwest, Northwest, Central China, South China, and Shenyang colleges of agriculture, and instituted a dual leadership system comprised of the Ministry of Agriculture and concerned provinces and municipalities with the Ministry of Agriculture leadership being paramount. At the same time, it approved the Shanxi Agricultural University, and Jiangxi Communist Labor University as a major national institution of higher learning under the leadership of the province.

Simultaneous with the revival and development of agricultural institutions of higher learning, efforts were made to improve the teaching quality. By 1979, the Ministry of Agriculture had already examined, approved and promulgated plans (trial drafts) for the Four specialized schools of agronomy, pomology, animal husbandry and veterinary science in agricultural institutes of higher learning, and a draft plan for instrument and equipment standards for eight agricultural microbiology laboratories. It had also organized teachers from agricultural institutions of higher learning throughout the country to write teaching outlines for 71 courses in agronomy, pomology, animal husbandry and veterinary medicine, and teaching materials for 160 courses in 12 fields of agronomy and animal husbandry. The Ministry of Agriculture, the Ministry of Foreign Affairs, and the Ministry of Education authorized establishment of [sister] school relationships between the Beijing Agricultural University and Minnesota University in the United States, Guelph University in Canada, and Hohenheim University in West Germany, between South China Agricultural College and Pennsylvania State University in the United States, and between Shenyang Agricultural College and Iowa University in the United States. They began reciprocal exchanges of specialists, teachers who lecture, exchange of data, exchange of students engaged in advanced studies, and cooperative research. The Ministry of Agriculture selected more than 50 teachers from agricultural institutions of higher learning throughout the country as visiting scholars who went to the United States, the United Kingdom, Japan, Canada, Yugoslavia, and Romania for study, refresher courses and improvement. They also commissioned experts and teachers from pertinent agricultural schools to conduct 27 refresher courses including basic English, basic Japanese, agricultural chemistry, botany, domestic animal environmental sanitation, entomological survey, veterinary clinical diagnosis, domestic animal dissection, and histopathology, farming, and animal biochemistry so as to train teachers and increase the level of specialized knowledge.

(Jiao Ji [3542 1323])

## Training Classes for Agriculture Leadership Cadres

In 1979, the Ministry of Agriculture entrusted seven agricultural institutions of higher learning including Beijing, and Zhejiang agricultural universities, and Shenyang, Northwest, Southwest, Central China, and South China agricultural colleges to conduct training classes for agricultural cadres. They trained separately the directors and deputy directors of agricultural and livestock bureaus in various provinces, municipalities, and autonomous regions who had not previously studied agricultural specialities, the chairman and deputy chairman of agricultural academies, and the chairmen and deputy chairmen of agricultural institutions of higher learning; prefectural secretaries responsible for agriculture, assistant directors, officers in charge of agricultural offices, directors of agricultural and livestock bureaus, county (or banner) CCP Committee secretaries, county heads, deputy secretaries in charge of agriculture, and cadres above the department level in the Ministry of Agriculture. Training would be twice each year, each period lasting from four to four and one-half months. Every 4 or 5 years, these cadres would be rotated once to training. Content of instruction was agricultural economics, agricultural programs and policies, agronomy (including plant physiology, genetic and breeding, crop cultivation, soil fertility, and plant protection), animal husbandry and veterinary medicine, and agricultural mechanization. Depending on the different needs of students, each class might set up elective courses. Through training and subsequent work experiences, these leading cadres in agricultural management would gradually change from greenhorns to insiders versed in their own profession.

During the last half of 1979, seven training classes were each in session for one period. Participating in the training were department level cadres from offices in the Ministry of Agriculture and affiliated units, and leading cadre responsible for agricultural work from 29 provinces, municipalities, and autonomous regions, 77 prefectures (or zhous), and 387 counties (or banners), numbering 514 students in all. Forty-two of the students were cadres from 16 national minorities. Aside from six of the students who were unable to complete the course, all others were tested and found to meet requirements and were issued certificates of completion for the course work.

(Yu Pei [6735 1014])

## Activities of the Chinese Agriculture Society

The Chinese Agriculture Society is an academic mass organization organized by China's agricultural scientists and technicians. It was founded in 1917, and known before Liberation as the "China Agriculture Society."

The present session's council has 145 council members, 43 standing committee council members, 14 deputy directors, and 1 director, all of them elected by a congress of the membership. This session's director is Yang Xiandong [2799 7359 2639].

The Chinese Agriculture Society is a combined organization that includes the Chinese Crop Society, the Chinese Horticulture Society, the Chinese Plant Protection Society, the Chinese Animal Husbandry and Veterinary Medicine Society, the Chinese Tea Society, the Chinese Serology Society, the Chinese Tropical Crops Society, the Chinese Cotton Society, the Chinese Apiary Society, the Chinese Atomic

Energy Agricultural Society, the Chinese Agro-Economics Society, the Chinese Grasslands Society, the Chinese Agricultural Engineering Society, and the Chinese Agricultural Modernization Research Society. Most provinces, municipalities, and autonomous regions have also established agricultural societies.

Centering on the central problem of how to accelerate the modernization of agriculture, in 1979 the Chinese Agricultural Society organized the broad masses of agricultural scientists and technicians for academic discussions and exchanges. Examples were the Northeast Region Agricultural Modernization Academic Discussion Meeting, and the Tropical Crops Modernization Academic Discussion Meeting, and the Tropical Crops Modernization Academic Discussion Meeting. The Chinese Agricultural Society has also regularly held academic discussion meetings and report-back meetings of various kinds or on various subjects. It has sent delegations abroad on inspection trips, to participate in international academic conferences, to exchange academic accomplishments, to increase their academic level, and to examine and approve as well as recommend effective technical measures.

This year the Chinese Agricultural Society turned to the 800 million peasants by actively launching agricultural science popularization work. It began with the publication of a collection of books titled "A Course of Lectures on Modernized Agricultural Science." In conjunction with the Central People's Broadcasting Station, it presented "Special Lectures on Agricultural Modernization Science Knowledge." It used newspapers and magazines to publish articles pertaining to agricultural technology. It showed science education films; it set up various slide shows in special fields. It operated training classes in various specialties.

In 1979, the Chinese Agricultural Society edited and published 17 academic publications. They may be generally divided into two major categories, learned journals and magazines. Learned journals include ZUOWU XUEBAO [Acta Agronomica Sinica], YUANYI XUEBAO [Acta Horiculturae Sinica], ZHIWU BAOHU XUEBAO [Acta Phytophylactica Sinica], ZHIWU BINGLI XUEBAO [Plant Pathology Journal], XUMU SHOUYI XUEBAO [Acta Veterinaria et Zootechnica Sinica]. Magazines include ZHONGGUO SHOUYI ZAZHI [Chinese Journal of Veterinary Medicine], ZHONGGUO XUMU ZAZHI [Chinese Journal of Animal Husbandry], ZHIWU BAOHU [Plant Protection], ZHONGGUO YANGFENG [Chinese Apiculture], CHAYE KEXUE [Tea Science], CANYE KEXUE [Silkworm Industry Science], REZUO KEJI TONGXUN [Tropical Crops Science and Technology Bulletin], NONGYE JINGJI WENTI [Problems of Agricultural Economics], YUANZINENG NONGYE YINGYONG [Agricultural Applications of Atomic Energy], YUANZINENG NONGYE YICONG [Translations on Agricultural Applications of Atomic Energy], ZHONGGUO CAOYUAN [Chinese Grasslands], and NONGYE GONGCHENG [Agricultural Engineering].

(Li Junkai [2621 0689 0418])

#### Widening of Foreign Agricultural Technology Exchange

In 1979, China's technological cooperation and exchange with foreign countries saw further development. According to incomplete statistics from the Ministry of Agriculture, a total of more than 420 people in 65 delegations and inspection groups were sent abroad during the year, and more than 580 people in 120 visiting delegations or groups arrived in China.

This year, China and the United States, Yugoslavia, France, Thailand, Argentina, and Japan arranged through government or civilian organizations for the exchange of special inspection delegations and groups in livestock, pomology, variety resources, and biological control. These exchanges were based on equality, mutual benefit and cooperation. Swiss, Japanese, French, and West German industrial plants and traders have sent seed and agricultural chemical experts for technical exchanges, and they have welcomed specialists whom China has sent abroad to study advanced techniques. Yugoslavian, French, and American special research organizations or agricultural institutions as well as international rice, wheat, corn, and potato research institutes have exchanged scholars with China, and welcomed specialists whom China has sent abroad for advanced study or for cooperative research. The United Nations Food and Agriculture Organization ran a technical training class in China on the use of remote sensing in soil surveys, and also sent some livestock specialists to China for short periods of teaching to help in the training of specialists. They also received isotope and paddy rice experts sent abroad from China for advanced studies. The Beijing Municipal Sino-Japanese Friendship People's Commune sent 25 young farmers and technicians to Fukushima and Hokkaido in Japan at the invitation of the Japanese to study paddy rice, vegetables, fruit trees, and milk cow feeding techniques.

Thirteen American agricultural specialists of Chinese descent, and one Canadian agricultural specialist of Chinese descent visited China at China's invitation to give numerous lectures and engage in academic exchange. They hold nationwide red soil improvement and domestic fowl epidemic disease training classes, and conducted 157 report-back meetings and academic discussion meetings.

(Zhu Pirong [2612 0012 2837])

#### Development of International Cooperative Relationships in Agricultural Technology and Economic Cooperation

In 1979, China developed long term cooperative relationships in agricultural technology and economics with numerous countries. In addition to signing agreements for technical cooperation with more than 10 countries, it made technical and economic cooperative arrangements with American, Yugoslavian, West German, French, Australian, and New Zealand business firms, and it entered into cooperative experiments and technical exchanges on agricultural chemicals, farm machinery, and seeds with Japanese, British, French and Swiss industrial plants and firms.

This year China introduced eight sets of agricultural machinery from Japan for pilot projects at Gongzhuling in Jilin, Wuxi in Jiangsu, Chongming in Shanghai, Linhua and Wuxing in Zhejiang, Jinxian in Jiangxi, and Dandu in Anhui. Plastic greenhouses introduced from Japan are being used experimentally at the Sijiqing People's Commune in the suburbs of Beijing. A modernized greenhouse introduced from Holland is being tested in the suburbs of Harbin. Modern livestock farm equipment and techniques were introduced from Australia and New Zealand. Through the auspices of the United Nations Food and Agriculture Organization, a complete range of seed processing equipment was introduced as well as grain drying equipment and remote sensing technical instruments and equipment for soil surveys. Additionally, a demonstration farm with modern facilities is planned for construction at the Wengniate Banner in the Nei Monggol Autonomous Region. More than 4700

varieties of agricultural crop seeds and nursery stock have been introduced from 38 countries and international organizations. From New Zealand and Australia have been introduced Romney sheep, and from Korea has been introduced eight different quail strains. From the United States has been imported Nigula [phonetic] white-feathered turkeys, and from Japan earthworms to further increase China's breed resources.

Additionally, China has presented 858 seed and nursery stock items for various farm crops to 18 countries. Rice hybrids are being tested in the United States, and some of them have yields of from 30 to 40 percent higher than local varieties.

(Zhu Pirong [2612 0012 2837])

94 32

CSO: 8111/0826-D

END

**END OF  
FICHE**

**DATE FILMED**

June 12, 1981